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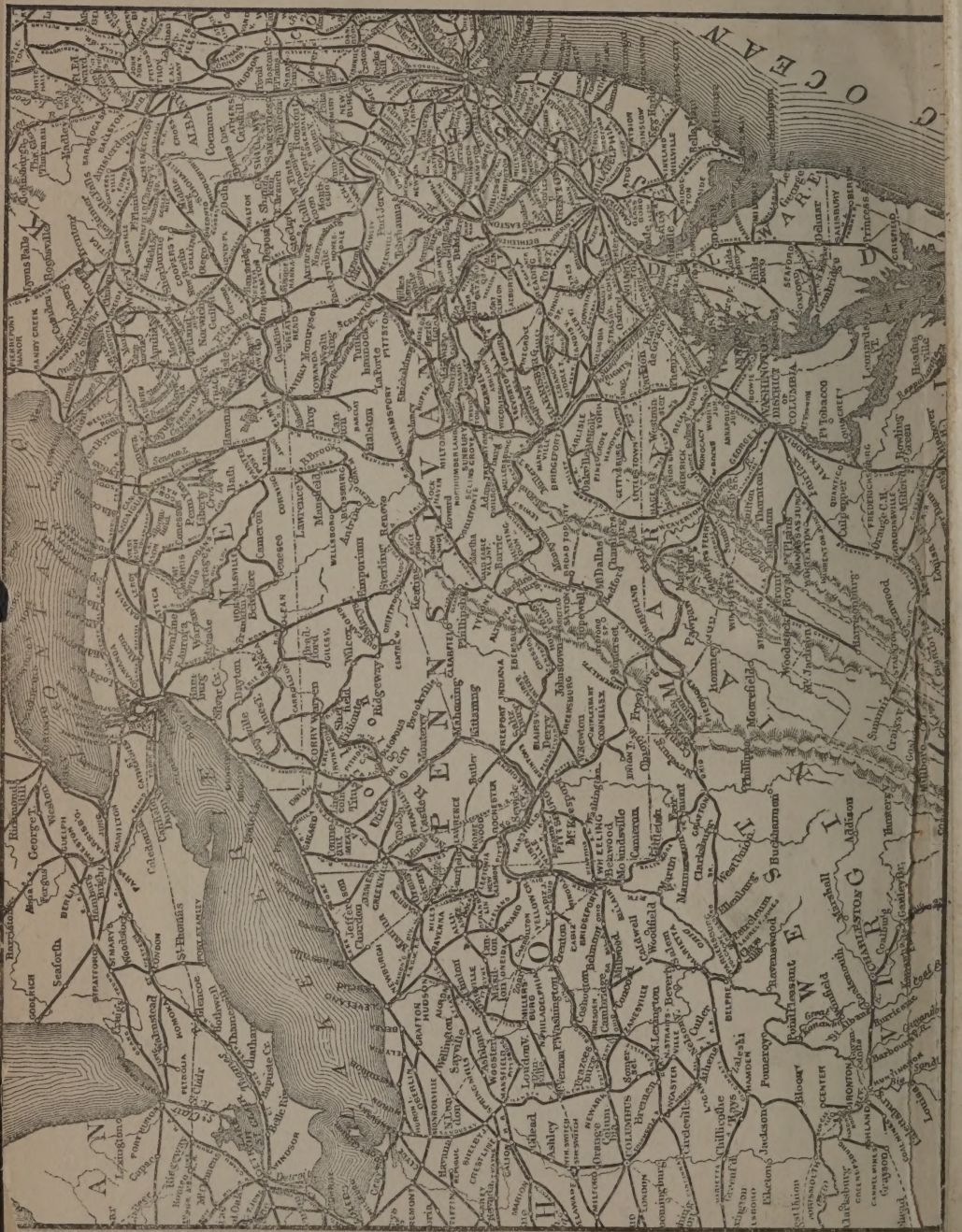
# THE COAL TRADE.

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THE COAL TRADE.









# THE COAL TRADE.

*A Compendium of valuable information relative to Coal production, Prices, Transportation, etc., at home and abroad, with many facts worthy of preservation for future reference.*

Corrected to the Latest Dates,

By FREDERICK E. SAWARD,

Editor of the "Coal Trade Journal."

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NEW YORK, JANUARY, 1874.

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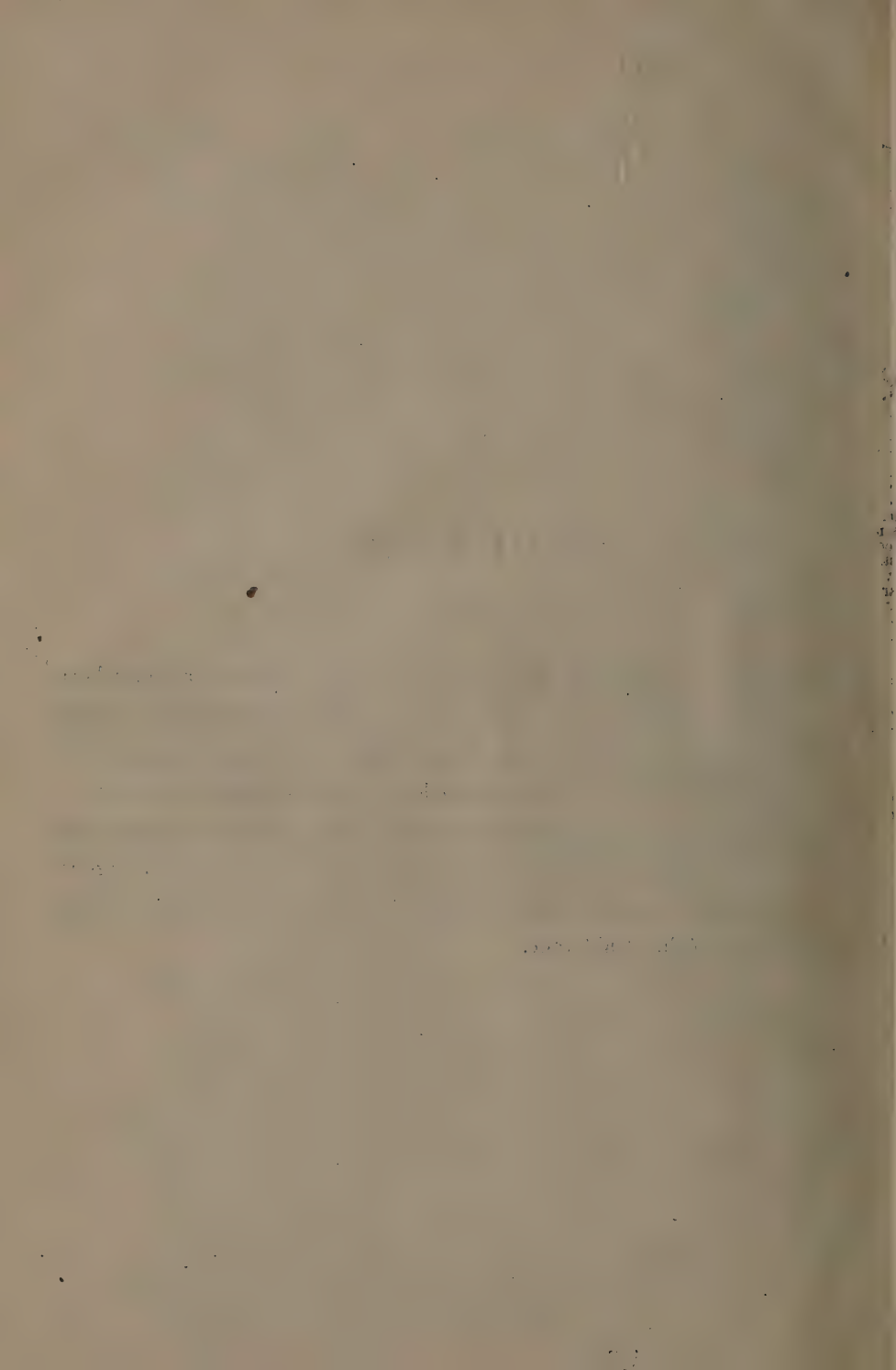
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The necessity of a practical hand-book on the Coal Trade has long been felt, and on the solicitations of our friends, we have prepared this present work. Wherever we have culled from foreign fields, we have given due credit, and to the many gentlemen who have assisted us, we acknowledge our thanks.

Any discrepancies or omissions which may have occurred will be corrected in a future edition ; and we shall be most happy to receive any suggestions or information that may lead to make it what it is intended to be, a perfect hand-book of the Coal Trade.

F. E. S.





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# THE COAL TRADE.

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By F. E. Saward.

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## INTRODUCTION.

The location of coal, the extent of country underlain by it; the means available for its transport to market; the cost of such transportation, and the selling prices of the commodity at the market; all furnish matter of interest to persons of sense and judgment, whether they be engaged directly or indirectly, with the coal industry of the country in which they may be located.

COAL of itself furnishes the element of power to any country or nation, that may be so fortunate as to be possessed of this mineral, in quantity, easy of development and within access of the consuming portion of its community, England owes her power and prosperity to the stores of coal which are annually produced, now upwards of 123,000,000 tons, or more than half the entire coal production of the whole globe, and this with a coal area of but 11,900 square miles.

What may we not expect, of the future of the United States, with coal of unlimited quantities situated within short distances of the consumers, having an extent of 192,000 square miles, divided through more than half of the states forming our Union.

In 1873 the coal production of which we find that any record has been made, amounted to 46,000,000 tons, with our constantly increasing population and railway facilities, together opening up and developing new fields of mineral wealth, with the growth of the iron industries; the fact that our country must soon take the front rank among the Industrial Empires of the world will not be gainsaid.

In these pages we aim to give plain facts as to the location of the various coal-fields from which supplies are drawn, rather than any geological description of strata, etc., making it the book of reference for the business man, and statistician.

Beginning therefore with the facts gathered by the U. S. Gov't in its last census we find a capital directly invested in collieries of one hundred and ten million dollars. An army of 92,454 persons directly employed in and about the works. These figures do not represent the money or lives that had been lost in bringing the industry to its present condition, or that expended in affording the mineral an outlet to market, after it has been taken from the earth.

The details are as follows:



**COAL TRADE OF THE UNITED STATES, FROM THE UNITED STATES  
CENSUS OF 1870.**

	No. of collieries.	H. P. steam engines.	Hands.	Capital.	Product. Tons.	Ave. va at colli
<b>Pennsylvania</b> .....						
Anthracite....	227	48,809	53,025	\$50,922,285	15,650,275	\$2
Bituminous..	361	1,851	17,156	16,989,418	7,798,518	1
<b>Illinois</b> .....	322	2,645	6,461	4,286,575	2,624,163	2
<b>Ohio</b> .....	307	3,663	7,567	5,891,813	2,527,285	2
<b>Maryland</b> .....	22	431	2,727	23,891,600	1,819,814	1
<b>Missouri</b> .....	56	2,308	1,878	2,587,250	621,930	3
<b>West Virginia</b> ..	41	177	1,140	1,434,800	608,878	1
<b>Indiana</b> .....	46	771	1,369	554,442	437,870	2
<b>Iowa</b> .....	96	145	1,354	618,332	263,487	3
<b>Kentucky</b> .....	30	125	714	717,950	150,582	2
<b>Tennessee</b> .....	11	51	419	313,784	133,418	2
<b>Virginia</b> .....	6	1,297	642	779,200	61,803	3
<b>Kansas</b> .....	20	....	252	166,430	32,938	3
<b>Michigan</b> .....	3	83	93	176,500	28,150	3
<b>Rhode Island</b> ...	2	140	75	80,000	14,000	4
<b>Alabama</b> .....	2	....	57	26,000	11,000	2
<b>Nebraska</b> .....	3	....	8	850	1,425	6
<b>Wyoming</b> .....	1	20	165	250,000	50,000	16
<b>Washington</b> ....	1	80	80	300,000	17,844	6
<b>Utah</b> .....	6	15	25	44,800	5,800	3
<b>Colorado</b> .....	3	....	16	36,000	4,500	3
<b>Total</b> .....	1,566	62,310	92,454	\$110,008,029	32,860,690	...

**STATISTICS OF BITUMINOUS COAL TRADE OF PENNSYLVANIA,  
FROM UNITED STATES CENSUS OF 1870.**

	No. of col- lieries.	H. P. steam engines.	Hands.	Capital.	Wages.	Cost of materials.	Product. Tons.	Value.
<b>Allegheny</b> .....	68	560	6,699	\$6,294,350	\$3,516,668	\$187,482	2,637,269	\$4,924,26
<b>Beaver</b> .....	16	..	83	116,550	27,650	3,121	28,020	52,72
<b>Bedford</b> .....	6	..	202	103,600	94,010	4,270	115,200	143,76
<b>Blair</b> .....	6	30	191	150,100	81,500	7,560	161,850	197,22
<b>Bradford</b> ....	2	40	750	550,000	560,000	44,600	350,000	370,00
<b>Butler</b> .....	46	..	149	78,575	57,000	10,403	63,118	114,11
<b>Cambria</b> .....	3	55	527	161,500	287,887	4,380	244,298	307,05
<b>Centre</b> .....	7	..	308	626,100	145,978	21,800	184,456	217,63
<b>Clarion</b> .....	9	..	103	85,151	41,570	6,775	55,540	69,73
<b>Clearfield</b> ....	11	..	279	360,800	147,903	23,137	181,237	248,15
<b>Elk</b> .....	2	..	242	366,000	78,920	8,104	78,779	136,06
<b>Fayette</b> .....	23	..	108	669,764	267,321	4,842	453,580	831,55
<b>Huntingdon</b> ....	7	..	934	251,775	175,014	18,229	163,603	241,95
<b>Indiana</b> .....	23	..	108	132,900	25,510	5,140	38,082	96,02
<b>Jefferson</b> .....	3	..	8	2,125	1,540	178	3,092	3,09
<b>Lawrence</b> .....	11	20	2,115	280,050	190,335	10,077	129,810	281,51
<b>Lycoming</b> .....	1	..	30	185,000	2,200	700	2,000	4,00
<b>McKean</b> .....	1	60	60	40,000	36,000	2,330	21,951	54,88
<b>Mercer</b> .....	34	814	1,994	1,712,225	1,130,827	170,457	669,875	1,869,07
<b>Somerset</b> .....	11	..	35	3,885	3,665	1,024	6,510	10,761
<b>Tioga</b> .....	3	36	1,683	100,000	650,000	6,100	733,562	1,112,88
<b>Venango</b> .....	11	..	108	131,100	51,020	1,071	36,230	98,45
<b>Warren</b> .....	1	..	2	3,000	200	200	200	1,000
<b>Washington</b> ....	27	61	1,640	1,298,118	489,880	24,395	510,077	696,581
<b>Westmoreland</b> ....	19	101	1,559	2,209,350	779,690	21,734	754,460	1,127,490
<b>Total</b> .....	361	1,851	16,855	\$16,989,418	\$8,998,015	\$591,327	7,798,518	\$12,935,035

## ANTHRACITE.

### GENERAL DESCRIPTION OF THE FIELDS.

Anthracite coal, peculiar almost to this country, and so valuable for metallurgical purposes, is found in an area of about 470 square miles, in Luzerne, Carbon, Schuylkill, Northumberland, Dauphin, and Columbia Counties, in the State of Pennsylvania, situated at an average distance of 150 miles from Philadelphia and New York harbor. The products of these fields have several avenues to market, which will be found mentioned below. There are three great divisions, which are named from their locations—the first or Southern, the second or Middle, and the third or Northern coal fields.

The Southern coal field lies principally in Schuylkill County, and hence it is often called the Schuylkill region.

The Mahanoy (often included in the Schuylkill) and Lehigh regions constitute the Middle coal field.

The Northern coal field is in Luzerne County, and embraces what is known as the Wyoming, Lackawanna, Scranton, and Wilkesbarre regions.

By the census report of 1870 it appears that there are 327 collieries; 829 engines, of 48,709 horse power; 43,938 men and 9,078 boys were employed; \$50,922,285 of capital invested, and \$22,980,293 wages, and \$3,610,462 worth of materials furnished in that year.

Prof. P. W. Sheaffer gives the following as the area of the several fields:

#### SCHUYLKILL COAL FIELD.

	Sq. miles.	Acres.
East of Tamaqua, mostly covered by lands of L. O. and N. Co....	16	10,240
Tamaqua to Pottsville.....	36	23,040
Pottsville, west to fork of Basin..	55	35,200
North Fork, Lyken's Valley Prong	16	10,240
South Fork, Dauphin Prong.....	15	9,600
North Mine Hill Range.....	8	5,120

Total.....146 93,440

#### SECOND OR MIDDLE COAL FIELD.

Shamokin District.....	30	32,000
Mahanoy.....	41	26,240
Beaver Meadow, Hazleton, Big and Little Black Creek Basins..	35	22,400

Total.....126 80,764

#### THIRD OR NORTHERN COAL FIELD.

Third or Northern coal field.....198 126,720

Grand total.....470 300,800

The production of Anthracite has been as follows:

	Tons
1820 .....	365
From 1820 to 1830.....	533,194
From 1830 to 1840.....	5,940,270
From 1840 to 1850.....	21,893,153
From 1850 to 1860.....	63,981,807
From 1860 to 1870.....	114,319,161
From 1820 to 1870 (50 yrs).....	206,666,325
1871.....	15,193,063
1872.....	18,929,263

Beside the production reported in the above schedules, it is estimated that some 2,500,000 tons are annually consumed in the coal regions by the engines, workmen, and local enterprises, the returns for which are not furnished by the colliery proprietors.

In regard to the probable exhaustion of these fields Prof. Sheaffer gives the following figures: Average total thickness of coal in the Southern coal field, 75 feet; Middle and Northern field, 45 feet; total cubic quantity, 26,361,076,000 tons. Deduct half for waste in mining, preparation, and faults, then we still have 13,180,538,000 tons. The amount mined from 1820 to 1870 (50 years) was 206,666,325 tons. Thus we have yet in store 12,973,878,675, which, at 25,000,000 tons per annum, will supply us for 520 years.

We shall now proceed to take up the several regions and give a detailed account of the route to market, production, &c.

#### THE LEHIGH REGION.

In 1820 there was shipped 365 tons of coal from this region.

In 1830 it amounted to a yearly business of 41,750 tons, and a total of 166,131 tons had been sent forward for the 10 years previous to this time.

In 1840 it amounted to a yearly business of 225,318 tons, and a total of 1,319,963 tons had been sent forward for the 10 years previous to this time.

In 1850 it amounted to a yearly business of 290,456 tons, and a total of 4,317,748 tons had been sent forward for the 10 years previous to this time.

In 1860 it amounted to a yearly business of

1,821,674 tons, and a total of 11,961,276 tons had been sent forward for the 10 years previous to this time.

In 1870 it amounted to a yearly business of 2,990,878 tons, and a total of 19,311,440 tons had been sent forward for the 10 years previous to this time, making a total production up to 1871 of 40,057,434 tons.

The coal mined from 1820 to 1854, inclusive, was forwarded by the Lehigh Canal. In 1855 the Lehigh Valley Railroad commenced to carry coal, taking 9,064 tons in that year. In 1868 the Lehigh and Susquehanna Railroad was in operation, and took 1,058,054 tons in that year.

The prices are fixed by a Board of Trade, at which each operator is represented, the New York Lehigh Coal Exchange making prices for tide coal, and the Lehigh Coal Exchange, at Philadelphia, fixing the rates for the line trade.

The accidents which occurred in this region during 1872 resulted in the death of 25 persons; there were 38 injured.

During 1872 the average price for Lehigh coal at New York was \$5 per ton, the average for 1873 was \$5.66. The average rate of transportation from Mauch Chunk to Elizabethport, 110 miles, in 1873, was \$1.82 per ton.

#### SCHUYLKILL REGION.

Next in importance is the Schuylkill region, it being the second to forward coal to market.

In 1822 1,480 tons were shipped.

In 1830 a yearly business of 89,984 tons was done, and for the 10 years previous there had been forwarded 186,059 tons.

In 1840 it amounted to a yearly business of 152,291 tons, and for the 10 years previous there had been forwarded 3,218,019 tons.

In 1850 it amounted to a yearly business of 1,712,007 tons, and for the 10 years previous there had been forwarded 10,258,740 tons.

In 1860 it amounted to a yearly business of 3,270,515 tons, and for the 10 years previous there had been forwarded 27,192,388 tons.

In 1870 it amounted to a yearly business of 3,720,403 tons, and for the 10 years previous there had been forwarded 37,801,521 tons, making a total production up to 1871 of 84,377,220 tons.

The coal produced from 1822 to 1841 was

forwarded by the Schuylkill Canal. In the Philadelphia and Reading Railroad commenced carrying coal, taking 850 tons in 1842.

The mines in this region are mainly controlled by the Philadelphia and Reading Coal and Iron Co., which is the Railway Company and the company own both the rail and coal outlet from the region to a market.

At Philadelphia (Port Richmond) the coal is carried by the Reading Railway to tide is shipped to Southern points and to the East States, the canal shipments being made at Pottsville and Schuylkill Haven.

The price is fixed by the Anthracite Board of Trade, meeting every month at Pottsville, Penna.

The accidents which occurred in this region during 1872 resulted in the death of 64 persons; there were also 216 injured.

The average of toll received for transportation in 1872 (94 miles) was \$1.54 per ton, and for 1873 it will probably average \$1.75.

During the year 1873 the average price of this coal at Philadelphia, f. o. b., was about \$4.50 per ton.

#### LACKAWANNA REGION.

The coal lands in the upper end of the Northern coal field are mainly owned by the large companies, viz.: Pennsylvania Coal Co., Delaware and Hudson Canal Co., and Delaware, Lackawanna and Western Railroad Co. and their product is sold as coming from the Lackawanna region, although each company has a distinctive trade name for its coal, "Lackawanna" being that shipped by the Delaware and Hudson Canal Co., at Rondout, N. Y.

"Pittston" coal is shipped at Newburgh, N. Y., by the Pennsylvania Coal Co.

"Scranton" coal is shipped by the Delaware Lackawanna and Western Railroad Company at Elizabethport and Hoboken, N. J., in New York harbor.

The first shipment made from this region was by the Delaware and Hudson Canal Co. 7000 tons being sent in 1829.

In 1850 the Pennsylvania Coal Co. commenced, and did a business of 111,014 tons in that year.

In 1854 the Delaware, Lackawanna and



estern Railroad Co, commenced, and did a business of 133,965 tons in that year.

From their organization these companies were received:

D. & H. C. Co. P. C. Co. D. L. & W.

29.....	7,000	.....	.....
30 to 1839.....	846,333	.....	.....
40 to 1849.....	2,897,981	.....	.....
50 to 1859.....	4,838,855	4,834,723	2,629,364
60 to 1869.....	10,098,691	7,249,820	13,343,126
70.....	2,039,722	3,086,008	2,348,097
71.....	1,366,471	802,039	1,916,486
72.....	2,931,767	1,213,478	1,507,483

The outlets to market from this region are as follows: The Pennsylvania Company's is sent by gravity railroad from Pittston to Hawley, thence by the Erie railroad to Newburgh.

The Delaware and Hudson Company's is carried from Carbondale, Archbald, and other places, by rail to Honesdale, thence by their canal to Rondout, on the Hudson River.

The Delaware, Lackawanna and Western Railroad coal goes to tide by their own railway from Scranton to Elizabethport and Hoboken. The prices for these coal vary; the first two lots to contractors, who take a certain quantity at rates fixed before the first of each month by the Delaware, Lackawanna and Western Railroad Company sell at auction.

Owning their outlets to market, or having contracts with others, it is almost impossible to fix a rate of transportation, but it has been estimated to cost one and a half cents per ton per mile.

#### WYOMING OR WILKESBARRE.

About the centre of the Northern coal field is the property of the Wilkesbarre Coal and Iron Co.; there are also several individual mining concerns, and this part of the region is what is known more particularly as the Wyoming region.

The Wilkesbarre Coal and Iron Co., are fast absorbing the properties in this part of the coal regions, and we give place to their business from 1870 to date.

1870.....	769,226
1871.....	950,754
1872.....	1,168,716

The coal from the Wilkesbarre Coal and Iron Co., and the individuals of this region is carried by the Lehigh Valley Railroad and New Jersey Central Railroad to tide water, at New York.

The transportation on coal from this region

is forty per cent. of the average price obtained for the coal at tide water.

The accidents in the Lackawanna and Wyoming regions in 1872 resulted in the death of 107 persons; and the injury of 306.

As showing the comparative production of the three coal fields, we append the following table:

Year.	Schuylkill.	Wyoming.	Lehigh.
1860.....	3,270,516	2,941,817	1,821,774
1861.....	2,607,489	3,055,140	1,738,377
1862.....	2,890,598	3,145,770	1,351,054
1863.....	3,443,265	3,769,610	1,984,713
1864.....	3,642,218	3,960,836	2,054,669
1865.....	3,735,802	3,256,638	1,822,535
1866.....	4,633,487	3,736,616	2,128,867
1867.....	4,334,820	5,328,322	2,062,446
1868.....	4,414,356	5,990,813	2,507,582
1869.....	4,748,960	6,068,865	1,929,583
1870.....	3,720,403	7,599,902	3,040,303
1871.....	5,124,780	6,481,171	2,249,356
1872.....	5,107,451	9,191,171	3,610,674

As showing the value of anthracite, for metallurgical purposes, we append the following results of analyses made for that purpose:

	Wyoming.	Schuylkill.	Lehigh.
Moisture.....	1.38	1.35	1.90
Vol. combustible matter.....	3.52	3.78	3.05
Ash.....	3.24	5.81	3.54
Fixed carbon.....	91.86	89.06	92.11
	100.00	100.00	100.00

#### SHAMOKIN, LYKENS VALLEY, ETC.

We find that in 1839, 11,390 tons of coal were shipped by the Northern Central Railroad, from Shamokin, and up to 1870 there had been sent 4,802,533 tons. In 1870, 486,174 tons; in 1871, 628,866 tons; in 1872, 569,689 tons.

We next find in 1849, 25,335 tons of coal were sent from the Lykens Valley, Short Mountain, and up to 1870, there had been sent 2,619,623 tons. In 1870, 67,775 tons; in 1871, 94,183 tons. In 1856 there was sent from Trevorton 73,112 tons and up to 1871 1,017,196 tons had been sent forward. The Summit Coal Co., commenced operations in 1866, and up to 1872 had mined and forwarded 1,113,258 tons of coal. The Big Lick Colliery commenced in 1870, and have mined to 1872, 237,004 tons of coal. In 1872 the Lykens Valley mines shipped 18,653 tons; Big Lick 138,308; Summit Branch 268,409; Short Mountain 32,276; Brookside 50,192; Tower City 38,577. These coals find a market at Baltimore, Havre-de-Grace, Washington, etc., some also to Port Richmond.

## PRICES OF COAL.

1872.

## New York Lehigh Coal Exchange,—

	Jan.	Feb.	Mar.
Lump.....	5 00	4 75	4 75
Broken.....	4 75	4 00	4 00
Egg.....	4 50	4 00	4 00
Stove.....	5 25	4 50	4 50
Chestnut.....	4 25	4 00	4 00
	April.	May.	June.
Lump.....	5 00	5 00	5 00
Broken.....	4 25	4 25	4 25
Egg.....	4 25	4 25	4 25
Stove.....	4 50	4 50	4 50
Chestnut.....	4 00	4 00	4 00
	July.	Aug.	Sept.
Lump.....	5 00	5 00	5 00
Broken.....	4 25	4 25	4 25
Egg.....	4 25	4 25	4 25
Stove.....	4 50	4 50	4 50
Chestnut.....	4 00	4 00	4 00
	Oct.	Nov.	Dec.
Lump.....	5 00	5 00	5 00
Broken.....	4 60	4 75	4 75
Egg.....	4 60	4 75	4 75
Stove.....	4 80	5 10	5 10
Chestnut.....	4 00	4 15	4 15

## Averages at Scranton Auction Sales,—

	Jan.	Feb.	Mar.
Lump.....	3 37	3 41	3 47½
Steamer.....	3 81	3 77½	3 53½
Broken.....	3 59½	3 59½	3 60
Egg.....	3 51	3 61½	3 63½
Stove.....	4 09	4 13½	4 09
Chestnut.....	3 32½	3 55	3 39
	April.	May.	June.
Lump.....	3 47½	3 34	3 29
Steamer.....	3 46	3 35	3 33
Broken.....	3 45½	3 47	3 46½
Egg.....	3 45½	3 52	3 55
Stove.....	3 89	3 83	3 97
Chestnut.....	3 38	3 54	3 56
	July.	Aug.	Sept.
Lump.....	3 22½	3 17½	3 67½
Steamer.....	3 26½	3 21	4 16½
Broken.....	3 42½	3 40	3 88
Egg.....	3 49	3 44½	4 05
Stove.....	3 89	3 77½	4 31
Chestnut.....	3 44½	3 24½	3 70
	Oct.	Nov.	Dec.
Lump.....	3 66	—	—
Steamer.....	4 03	3 79½	—
Broken.....	3 91	3 90	—
Egg.....	4 15	4 10	—
Stove.....	4 65	4 77	—
Chestnut.....	3 79	3 76½	—

## Delaware and Hudson Canal Co.,—

	Jan.	Feb.	Mar.
Lump.....	4 20	4 20	3 75

Steamer.....	4 30	4 30	3
Broken.....	4 50	4 50	3
Egg.....	4 75	4 75	3
Stove.....	5 00	5 00	4
Chestnut.....	4 50	4 50	3
	April.	May.	June.
Lump.....	3 60	3 60	3
Steamer.....	3 70	3 70	3
Broken.....	3 80	3 80	3
Egg.....	3 90	3 90	3
Stove.....	4 25	4 15	3
Chestnut.....	3 75	3 80	3
	July.	Aug.	Sept.
Lump.....	3 50	3 50	3
Steamer.....	3 50	3 50	3
Broken.....	3 50	3 50	3
Egg.....	3 70	3 70	3
Stove.....	4 00	4 00	4
Chestnut.....	3 50	3 60	3
	Oct.	Nov.	Dec.
Lump.....	4 00	4 00	4
Steamer.....	4 10	4 10	4
Broken.....	4 10	4 20	4
Egg.....	4 30	4 45	4
Stove.....	4 60	4 90	5
Chestnut.....	4 10	4 20	4

## Pennsylvania Coal Co.,—

	Jan.	Feb.	March.
Lump.....	4 40	4 00	3
Steamer.....	4 40	4 00	3
Broken.....	4 60	4 15	3
Egg.....	4 70	4 25	4
Stove.....	5 00	4 50	4
Chestnut.....	4 40	4 00	3
	April.	May.	June.
Lump.....	3 60	3 70	3
Steamer.....	3 60	3 70	3
Broken.....	3 75	3 80	3
Egg.....	3 85	3 90	3
Stove.....	4 10	4 15	3
Chestnut.....	3 60	3 80	3
	July.	Aug.	Sept.
Lump.....	3 50	3 50	3
Steamer.....	3 50	3 50	3
Broken.....	3 50	3 50	3
Egg.....	3 50	3 50	3
Stove.....	3 70	3 70	3
Chestnut.....	3 50	3 50	3
	Oct.	Nov.	Dec.
Lump.....	3 80	3 80	4
Steamer.....	3 80	3 80	4
Broken.....	3 80	3 80	4
Egg.....	3 80	3 80	4
Stove.....	4 10	4 25	4
Chestnut.....	3 80	3 80	4

## Lehigh Coal and Navigation Co.,—

	Jan.	Feb.	March.
Lump.....	5 00	—	—
Broken.....	4 75	—	—
Egg.....	4 50	—	—
Stove.....	5 25	—	—
Chestnut.....	4 25	—	—

No prices

	April.	May.	June.	July.	Aug.	Sept.
up.....	5 25	5 15	5 15	Lump.....	3 50	3 70
ken.....	4 40	4 35	4 35	Steamer.....	3 45	3 60
e.....	4 40	4 35	4 35	Broken.....	3 60	3 80
stnut.....	4 60	4 60	4 60	Egg.....	3 60	3 60
	4 10	4 00	4 00	Stove.....	3 75	3 80
				Chestnut.....	2 75	2 70
	July.	Aug.	Sept.		Oct.	Nov.
up.....	5 25	5 25	5 25	Lump.....	3 90	3 90
ken.....	4 50	4 50	4 50	Steamer.....	3 90	3 90
e.....	4 50	4 50	4 50	Broken.....	4 00	4 00
stnut.....	4 60	4 50	4 50	Egg.....	4 00	4 25
	4 00	4 00	4 00	Stove.....	4 35	4 60
				Chestnut.....	3 35	3 50
	Oct.	Nov.	Dec.			
up.....	5 25	5 25	5 25			
ken.....	4 75	4 85	4 85			
e.....	4 75	4 90	4 90			
stnut.....	4 90	5 15	5 15			
	4 00	4 15	4 15			

1873.

## New York Lehigh Coal Exchange,—

	Jan.	Feb.	Mar.		Jan.	Feb.	Mar.
up.....	4 00	3 75	3 75	Lump.....	5 00	5 00	5 00
mer.....	4 25	3 75	3 75	Broken.....	4 75	5 20	5 20
ken.....	4 40	3 85	3 85	Egg.....	4 75	5 20	5 20
e.....	4 50	3 85	3 85	Stove.....	5 10	5 50	5 50
stnut.....	5 25	4 25	4 25	Chestnut.....	4 15	4 60	4 60
	4 25	3 75	3 75				
	April.	May.	June.		April.	May.	June.
up.....	3 75	3 75	3 75	Lump.....	5 25	5 35	5 45
mer.....	3 75	3 75	3 75	Broken.....	5 20	5 20	5 30
ken.....	3 85	3 85	3 85	Egg.....	5 20	5 20	5 30
e.....	3 85	3 85	3 85	Stove.....	5 25	5 35	5 45
stnut.....	4 35	4 35	4 25	Chestnut.....	4 60	4 65	4 75
	3 80	3 80	3 80				
	July.	Aug.	Sept.		July.	Aug.	Sept.
up.....	3 75	3 75	3 60	Lump.....	5 55	5 65	5 75
mer.....	3 75	3 75	3 65	Broken.....	5 40	5 50	5 60
ken.....	3 85	3 85	3 85	Egg.....	5 40	5 50	5 60
e.....	3 85	3 85	3 85	Stove.....	5 55	5 65	5 75
stnut.....	4 25	4 25	4 10	Chestnut.....	4 85	4 95	5 05
	3 80	3 80	3 60				
	Oct.	Nov.	Dec.		Oct.	Nov.	Dec.
up.....	4 00	4 00	4 00	Lump.....	5 85	5 85	5 85
mer.....	4 10	4 20	4 20	Broken.....	5 70	5 70	5 70
ken.....	4 35	4 40	4 40	Egg.....	5 70	5 70	5 70
e.....	4 35	4 50	4 50	Stove.....	5 85	5 95	5 95
stnut.....	4 60	5 00	5 00	Chestnut.....	5 15	5 15	5 15
	4 10	4 00	4 00				

## Delaware &amp; Hudson Canal Co.,—

	Jan.	Feb.	Mar.		Jan.	Feb.	Mar.
up.....	4 05	3 40	3 40	Lump.....	4 20	4 60	4 60
mer.....	4 05	3 40	3 40	Steamer.....	4 30	4 70	4 70
ken.....	4 35	3 50	3 50	Broken.....	4 40	4 80	4 80
e.....	4 50	3 75	3 75	Egg.....	4 65	5 05	5 05
stnut.....	4 75	3 75	3 30	Stove.....	5 10	5 50	5 55
	3 00	3 00	2 75	Chestnut.....	4 30	4 60	4 60
	April.	May.	June.		April.	May.	June.
up.....	3 35	3 50	3 50	Lump.....	4 45	4 55	4 65
mer.....	3 35	3 35	3 35	Steamer.....	4 55	4 65	4 75
ken.....	3 60	3 60	3 60	Broken.....	4 65	4 75	4 85
e.....	3 60	3 60	3 60	Egg.....	4 80	4 90	5 00
stnut.....	3 75	3 75	3 70	Stove.....	5 00	5 10	5 20
	2 75	2 75	2 75	Chestnut.....	4 45	4 55	4 65
	July.	Aug.	Sept.		July.	Aug.	Sept.
up.....	4 75	4 85	4 95	Lump.....	4 75	4 85	4 95
mer.....	4 85	4 95	5 05	Steamer.....	4 85	4 95	5 05
ken.....	4 95	5 05	5 15	Broken.....	4 95	5 05	5 15
e.....	5 10	5 20	5 30	Egg.....	5 10	5 20	5 30
stnut.....	5 30	5 40	5 50	Stove.....	5 30	5 40	5 50
	4 65	4 75	4 85	Chestnut.....	4 65	4 75	4 85

## HUYLEKILL WHITE ASH, at Port Richmond—



				Wilkesbarre Coal & Iron Co.,—			
	Oct.	Nov.	Dec.		Jan.	Feb.	Mar.
Lump.....	5 05	5 05	5 05	Lump.....	4 25	4 45	4 4
Steamer.....	5 15	5 15	5 15	Steamer.....	4 35	4 55	4 4
Broken.....	5 25	5 25	5 25	Broken.....	4 45	4 65	4 4
Egg.....	5 40	5 40	5 40	Egg.....	4 70	4 90	4 4
Stove.....	5 60	5 70	5 70	Stove.....	5 15	5 35	5 5
Chestnut.....	4 95	5 05	5 05	Chestnut.....	4 35	4 45	4 4
Pennsylvania Coal Co.,—					April.	May.	Jun.
	Jan.	Feb.	Mar.				
Lump.....	4 25	4 40	4 50	Lump.....	4 45	4 55	4 4
Steamer.....	4 25	4 40	4 50	Steamer.....	4 55	4 65	4 4
Broken.....	4 40	4 40	4 50	Broken.....	4 65	4 75	4 4
Egg.....	4 40	4 30	4 70	Egg.....	4 80	4 90	5 5
Stove.....	4 90	5 00	5 00	Stove.....	5 00	5 10	5 5
Chestnut.....	4 25	4 40	4 40	Chestnut.....	4 45	4 55	4 4
	April.	May.	June.		July.	Aug.	Sept.
Lump.....	4 40	4 50	4 60	Lump.....	4 75	4 85	4 4
Steamer.....	4 40	4 50	4 60	Steamer.....	4 85	4 95	5 5
Broken.....	4 50	4 60	4 70	Broken.....	4 95	5 05	5 5
Egg.....	4 60	4 70	4 80	Egg.....	5 10	5 20	5 3
Stove.....	4 90	5 00	5 10	Stove.....	5 30	5 40	5 5
Chestnut.....	4 40	4 50	4 60	Chestnut.....	4 75	4 85	4 4
	July.	Aug.	Sept.		Oct.	Nov.	Dec.
Lump.....	4 70	4 80	4 90	Lump.....	5 05	5 05	5 0
Steamer.....	4 70	4 80	4 90	Steamer.....	5 15	5 15	5 0
Broken.....	4 80	4 90	5 00	Broken.....	5 25	5 25	5 0
Egg.....	4 90	5 00	5 10	Egg.....	5 40	5 40	5 4
Stove.....	5 20	5 30	5 40	Stove.....	5 60	5 70	5 5
Chestnut.....	4 70	4 80	4 90	Chestnut.....	5 05	5 05	5 0
				Schuylkill White Ash—			
	Oct.	Nov.	Dec.—W.		April.	May.	Ma
Lump.....	5 00	5 00	4 60	Lump.....	4 00	4 00	4 1
Steamer.....	5 00	5 00	4 60	Steamer.....	4 00	4 00	4 1
Broken.....	5 10	5 10	4 70	Broken.....	4 00	4 00	4 2
Egg.....	5 20	5 20	4 80	Egg.....	4 15	4 15	4 2
Stove.....	5 50	5 50	5 10	Stove.....	4 30	4 30	4 4
Chestnut.....	4 90	4 80	4 59	Chestnut.....	3 50	3 50	3 5
Lehigh Coal and Navigation Co.,—					June.	July.	Aug.
	Jan.	Feb.	Mar.				
Lump.....	5 25	5 25	5 25	Lump.....	4 20	4 30	4 4
Broken.....	4 85	5 25	5 20	Steamer.....	4 20	4 30	4 4
Egg.....	4 90	5 20	5 20	Broken.....	4 30	4 40	4 5
Stove.....	5 15	5 50	5 50	Egg.....	4 30	4 40	4 5
Chestnut.....	4 15	4 60	4 60	Stove.....	4 50	4 60	4 7
	April.	May.	June.		Sept.	Oct.	Nov.
Lump.....	5 50	5 50	5 50	Lump.....	4 50	4 60	4 6
Broken.....	5 30	5 35	5 45	Steamer.....	4 50	4 60	4 6
Egg.....	5 30	5 35	5 45	Broken.....	4 60	4 70	4 7
Stove.....	5 35	5 40	5 50	Egg.....	4 60	4 70	4 7
Chestnut.....	4 60	4 70	4 80	Stove.....	4 80	4 90	5 00
	July.	Aug.	Sept.		Oct.	Nov.	Dec.
Lump.....	5 70	5 80	5 90	Chestnut.....	3 85	3 95	3 95
Broken.....	5 55	5 65	5 75				
Egg.....	5 55	5 65	5 75				
Stove.....	5 60	5 70	5 80				
Chestnut.....	4 90	5 00	5 10				
	Oct.	Nov.	Dec.	NOTE.—Pennsylvania Coal Co., and Delaware and Hudson prices for January, February, March and December are at Weehawken.			
Lump.....	6 00	6 00	6 00				
Broken.....	5 85	5 85	5 85				
Egg.....	5 85	5 85	5 85				
Stove.....	5 95	5 95	5 95				
Chestnut.....	5 20	5 20	5 20	The above figures are taken from the official circulars issued from time to time, and must be so taken as indicative of the market prices. At times, there may be sales made at reduced rates owing to some peculiar condition of the trade, between the dates of issuing price lists.			

## PRICES OF SCHUYLKILL COAL.

We give below the average prices for Schuyll White Ash Lump coal, on board vessels at Philadelphia, from 1834 to 1873, inclusive, prepared by W. G. Nielson, and I. W. Morris:

Years.	Prices.	Years.	Prices.
834.....	\$4 50	1854.....	\$5 19
835.....	4 84	1855.....	4 49
836.....	6 64	1856.....	4 11
837.....	6 72	1857.....	3 87
838.....	5 27	1858.....	3 43
839.....	5 00	1859.....	3 25
840.....	4 91	1860.....	3 40
841.....	5 79	1861.....	3 39
842.....	4 18	1862.....	4 14
843.....	3 27	1863.....	6 06
844.....	*3 20	1864.....	†8 39
845.....	3 46	1865.....	7 86
846.....	3 90	1866.....	5 80
847.....	3 80	1867.....	4 37
848.....	3 50	1868.....	3 86
849.....	3 62	1869.....	5 31
850.....	3 64	1870.....	4 39
851.....	3 34	1871.....	4 46
852.....	3 46	1872.....	3 74
853.....	3 70	1873.....	4 19

\*Lowest point. †Highest point.

## AVERAGES OF SCRANTON SALES.

FOR THE YEAR 1873.

	Jan. 3rd.	Jan. 31st.	Feb. 26th.
Lump.....	\$3 60	.....	\$3 87
Steamer.....	3 75	4 11 $\frac{3}{4}$	4 10
Broken.....	3 90 $\frac{1}{2}$	4 27 $\frac{1}{2}$	4 19
Egg.....	4 07 $\frac{1}{2}$	4 34 $\frac{1}{2}$	4 45
Stove.....	4 77 $\frac{1}{2}$	5 04 $\frac{1}{4}$	5 25
Chestnut.....	3 90	3 92 $\frac{1}{4}$	3 96
	Mar. 26.	April 30.	May 28.
Lump.....	\$4 17 $\frac{1}{2}$	\$4 27 $\frac{1}{2}$	\$4 31
Steamer.....	4 15	4 22 $\frac{1}{2}$	4 44
Broken.....	4 34 $\frac{1}{2}$	4 49	4 62
Egg.....	4 58	4 67	4 83
Stove.....	5 03	5 10	5 17 $\frac{1}{2}$
Chestnut.....	4 17	4 30	4 44
	June 26.	July 30.	Aug. 27.
Lump.....	\$4 43	.....	.....
Steamer.....	4 55 $\frac{1}{2}$	4 76 $\frac{1}{2}$	4 87 $\frac{1}{2}$
Broken.....	4 75	4 98	5 04
Egg.....	5 02	5 27 $\frac{1}{2}$	5 38
Stove.....	5 26	5 38	5 45
Chestnut.....	4 59	4 74	4 77
	Sept. 24.	Oct. 39.	Nov. 26.
Lump.....	.....	.....	.....
Steamer.....	\$4.80 $\frac{1}{2}$	\$4.83 $\frac{1}{4}$	\$4.86
Broken.....	5.00 $\frac{1}{2}$	5.00	4.99
Egg.....	5.33 $\frac{1}{2}$	5.31 $\frac{1}{4}$	5.30
Stove.....	5.46	5.45	5.42 $\frac{1}{4}$
Chestnut.....	4.71	4.55	4.52 $\frac{1}{4}$

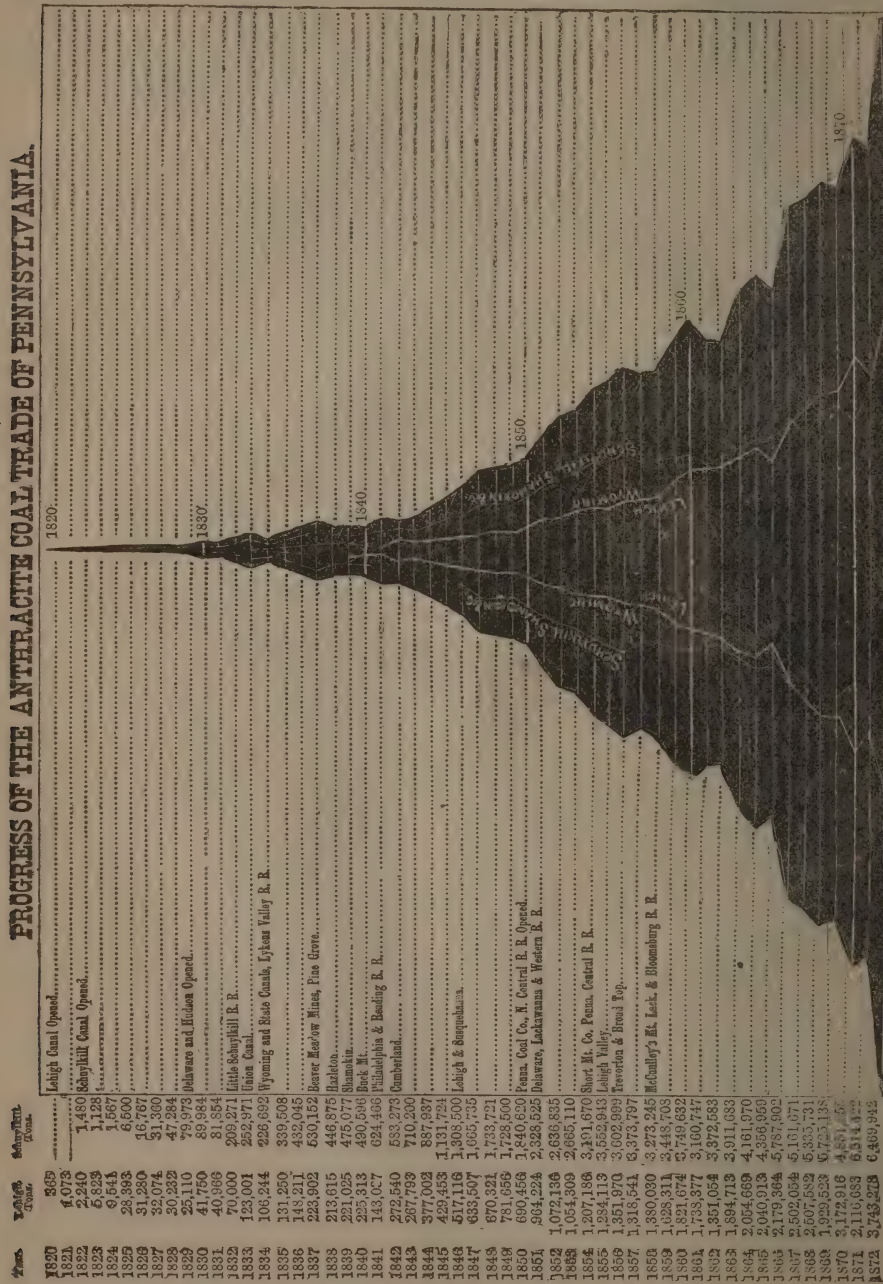
## COAL AT AUCTION.

Below will be found a very interesting table, giving the average result of the Scranton Auction Sales, prepared for us by Mr. JOHN MOORE, with the Philadelphia and Reading Co.

1869 January 27th.....	\$5 21
February 25th.....	4 36 $\frac{1}{4}$
March 31st.....	4 58
April 28th.....	4 79
September 1st.....	6 76
September 29th.....	6 08
October 27th.....	6 41
November 24th.....	4 82
December 29th.....	5 18
1870 January 26th.....	4 42
February 23rd.....	4 32
March 30th.....	4 77
April 27th.....	4 59
May 25th.....	4 50 $\frac{1}{2}$
June 29th.....	4 57
July 27th.....	4 89
August 31st.....	4 77
September 28th.....	4 65
October 26th.....	4 29 $\frac{1}{4}$
November 30th.....	3 99 $\frac{1}{4}$
1871 May 31st.....	5 10 $\frac{1}{4}$
June 28th.....	4 85
July 26th.....	4 86 $\frac{1}{2}$
August 30th.....	5 01
September 27th.....	5 28 $\frac{1}{2}$
October 25th.....	4 44 $\frac{1}{2}$
November 29th.....	4 40
December 27th.....	4 31 $\frac{1}{2}$
1872 January 31st.....	3 76
February 28th.....	3 80 $\frac{1}{2}$
March 27th.....	3 78 $\frac{1}{2}$
April 29th.....	3 61 $\frac{1}{4}$
May 29th.....	3 59 $\frac{1}{2}$
June 26th.....	3 62
July 31st.....	3 53
August 28th.....	3 46 $\frac{1}{2}$
September 25th.....	3 99
October 30th.....	4 11
November 27th.....	4 24
1873 January 3rd.....	4 13
January 29th.....	4 49
February 26th.....	4 46
March 26th.....	4 56 $\frac{1}{2}$
April 30th.....	4 65
May 28th.....	4 75 $\frac{1}{2}$
June 25th.....	4 90 $\frac{1}{2}$
July 31st.....	5 10 $\frac{1}{2}$
August 27th.....	5 17
September 24th.....	5 17
October 29th.....	5 18
November 26th.....	5 16

# PROGRESS OF THE ANTHRACITE COAL TRADE OF PENNSYLVANIA.

Year  
Year  
Year



By P. W. STEAFER, Engineer and Geologist. Pottsville, Pa.



## Anthracite Shipping Ports.

### PORT RICHMOND, PHILA.

One of the largest of the coal shipping points at tide-water, at which the Anthracite coal is received and shipped, is that known as Port Richmond, situated on the Delaware river, above the city of Philadelphia. The extent of facilities for receiving, storing, handling, and shipping coal, are all first-class. The wharves and piers are owned by the Philadelphia and Reading Railroad Co. By the iron steam colliers of this company shipments may now be made at all seasons of the year.

### TRENTON, N. J.

The wharves and pockets here are owned by the Pennsylvania Railroad Co., who have charge of the shipping facilities and ship for a number of parties. The shipments are mainly in canal boats and schooners, for the Sound trade. Freight is usually from 40 to 50 cents over Elizabethport quotations.

### SOUTH AMBOY, N. J.

At this point, almost always accessible by vessels of any draft of water, there are excellent shipping facilities, and quite an increasing business is being done; the Pennsylvania Railroad Co. own the wharves. Freight is seldom more than 5 cents higher than Elizabethport.

### ELIZABETHPORT, N. J.

Elizabethport is 13 miles from New York City, in a south-westerly direction. The coal shipping wharves number fifteen, and are owned as follows;—The first six by the Central Railroad of N. J., shipping for various parties. Then follow the four owned by the D. L. & W. Railroad Co., and over which they ship their Scranton coal; next above these are three piers known as A B and C, owned and operated by Samuel Bonnell, Jr., then follows the Mineral Spring Coal Co's pier, known as pier 9. G. B. Linderman & Co., ship over pier 5. The piers are numbered from south to north, pier 1 being the most southerly, and pier 9 the farthest up stream or north.

### PORT JOHNSTON, N. J.

This coal shipping point is about ten miles

from New York, and three miles nearer than Elizabethport.

The facilities consist of three large piers. One is leased by the Lehigh Coal and Navigation Co., one by the Wilkesbarre Co., from the other the N. J. Central Railroad Co., ship for a number of parties. Vessels of any draft of water may be loaded here. Freight is the same as from Elizabethport.

### JERSEY CITY, N. J.

The coal that arrives at this point by the Morris Canal, is transferred direct from the canal boats into vessels and barges, or stored on the docks.

The Delaware, Lackawanna and Western Railroad Co., have a large dock here, as they receive a considerable amount of coal by the Morris Canal. The basins and docks are owned by the Lehigh Valley Railroad Co., as lessees of the Morris Canal.

### HOBOKEN, N. J.

There are three piers here for the shipment of Anthracite coal, one used by the Delaware, Lackawanna and Western Railroad Co., the second by the Wilkesbarre Coal and Iron Co., while the third is for the accommodation of various parties.

### WEEHAWKEN, N. J.

Above Hoboken, are the coal docks of the Delaware and Hudson Canal Co., and the Pennsylvania Coal Co., at which the coal carried for these companies to tide during the winter by the Erie Railroad is shipped;

### NEWBURGH, N. Y.

About 60 miles from New York City, on the Hudson River; this point is the principal shipping place of the Pennsylvania Coal Co. Freight from this point to New York are 60 cents per ton, and to Boston and the Sound 20 cents per ton over Elizabethport.

### RONDOUT, N. Y.

This is the shipping point of the Delaware and Hudson Canal Co., for their Lackawanna coal. It is 85 miles from New York on the Hudson River. The coal is brought by rail from the mines to Honesdale, where it is dumped into boats which carry it to Rondout. Freight to New York, say 65 cents.



## COST OF TRANSPORTATION.

From Schuylkill Haven, Penna., to Port Richmond, (Phila.,)

Ninety-four miles.

1869.	April....	\$2,00 less drawback of 97½ cts.
"	May.....	2,00 " 54 cts.
"	June.....	2,00 no drawback.
"	Aug. to, and including Dec.	\$2,50, no drawback.
1870.	January and February	\$2,00, no drawb'k
"	March, to and including Aug.	2,00 less drawback of 80 cts.
"	September	\$2,00 less drawback of 40 cts.
"	October..	" 43½ cts.
"	Nov. and Dec."	" 48½ cts.
1871.	January..	" 48½ cts.
"	February to 15th	\$2,00 no drawb'k.
"	February 15th to 28th..	4,00 "
"	March and April.....	6,00 "
"	May.....	1,85 "
"	June (10 per cent off Lump & Str)..	\$1,85
"	July " " "	1,45
"	August " " "	1,65
"	September.....	1,85
"	October, November and December..	2,00
1872	January.....	2,00
"	February, March and April, (10 per cent off Lump, Steamer and Broken).....	1,25
"	May, (10 per cent off Lump and Steamer).....	1,30
"	June " " "	1,50
No shipping charges for month of June.		
"	July.....	1,50
"	August, (10 per cent off Egg, Stove, Chestnut..	1,50
"	September.....	1,50
"	October.....	1,60
"	November.....	1,65
"	December.....	1,65
1873	January.....	1,65
"	February.....	1,65
"	March.....	1,52
"	April.....	1,52
"	May.....	1,62
"	June.....	1,72
"	July.....	1,77
"	August.....	1,82
"	September.....	1,87
"	October.....	1,92
"	November.....	1,92
"	December.....	1,92

## COST OF TRANSPORTATION.

From Mauch Chunk to Elizabethport, N. J.  
One hundred and ten miles.

*Not including wharfage and shipping.*

1869.	August to, and including January 8th, 1870.....	\$2,75
1870.	January 10th to January 31st.....	2,34
"	February to, and including July.....	2,03
"	August and September.....	2,11
"	October.....	2,06
"	November.....	1,93½
"	December to 19th.....	1,85
"	December 21st to 31st.....	1,93½
1871.	January and to February 15th.....	2,05
"	February 15th, to May 16th.....	4,53
"	May 16th, to June 15th.....	2,40
"	June 15th, to July 1st.....	2,09
"	July and August.....	2,11
"	September.....	2,15
"	October.....	2,28
"	November.....	2,13
"	December.....	1,87
1872	January.....	1,78
"	February.....	1,59
"	March.....	1,59
"	April.....	1,64
"	May.....	1,64
"	June.....	1,64
"	July.....	1,64
"	August.....	1,64
"	September.....	1,64
"	October.....	1,64
"	November.....	1,72
"	December.....	1,78
1873.	January.....	1,78
"	February.....	1,91
"	March.....	1,91
"	April.....	1,91
"	May.....	1,93
"	June.....	1,96
"	July.....	2,00
"	August.....	2,04
"	September.....	2,07
"	October.....	2,11
"	November.....	2,11
"	December.....	2,11

TABLE SHOWING THE TOLLS ON ONE TON OF COAL OF 2240 LBS—

Place	Albany Miles.	Albany Tolls.	Troy Miles.	Troy Tolls.
Schenectady	30	.03.36	23	.02.58
Utica	110	.12.32	103	.11.54
Syracuse	166	.18.39	159	.17.81
Rochester	259	.29.01	252	.28.82
Oswego	204	.22.85	197	.22.06
Brookport	279	.31.25	272	.30.46
Lockport	321	.35.95	314	.34.17
Tonawanda	340	.38.08	333	.37.30
Buffalo	352	.39.42	345	.38.64
The rate per mile on one gross ton is 1.12-103 mills.				

MAP OF THE  
ANTRIM.

**BLOSSBURG,**  
MCINTYRE & TOWANDA.  
**COAL REGIONS.**

Flak & Russell, Eng's N.Y.



## BITUMINOUS COAL.

Our attention at this time will be given to the location and product of those districts which are of most interest to the consumers and dealers in the Middle States and on the Atlantic seaboard.

## NOVA SCOTIA.

Beginning with Nova Scotia, our most northerly and easterly source of supply, we find a production of coal, suitable for gas and steam uses, to the extent of an average yearly business of, say, 700,000 tons, the largest yield being that of the year 1873. The exports to the United States at present do not exceed 200,000 tons, of which the bulk is to Boston, Mass., and points eastward, where it enters into competition with Broad Top and Cumberland for steam uses and our Pennsylvania and West Virginia gas coals in the manufacture of gas.

Nova Scotia coal was admitted into the United States free of duty during the years 1854 to 1865, and the average annual production of those 12 years was only 333,427 tons. A monopoly of these regions was granted to the Duke of York in 1826, but it was relinquished in August, 1857. The production from the commencement in 1827 to 1872, inclusive, amounted to 11,210,673 tons. The most important regions are Pictou, and Sydney or Cape Breton, as will be seen from the tables of the production. New Brunswick possesses a mine of what is called Albertite, a variety of asphalt which yields 100 gallons of crude oil to the ton, or 14,500 cubic feet of gas. It was discovered in 1849. The Pictou field, from which nearly 50 per cent of the yield is had, is said to contain some 28 square miles, but the available space for working is much less. By far the most extensive and important is the Cape Breton or Sydney field. It extends about 35 miles along the coast, and ranges from four to five miles in width, which includes many bays and indentations of the coast.

A detailed report of the production will be found elsewhere.

## BLOSSBURG.

The next source of supply which invites our attention is the Blossburg, situated in Tioga County, Pennsylvania. The first coal from this region was sent to market from the Bloss mines in 1840. From this date it has enlarged

until it amounts to upwards of 800,000 tons. The producers of this region are the Fall Brook Coal Company, Morris Run Coal Company, and Blossburg Coal Company, with mines near Blossburg, Tioga County, Pa. The production of each company up to 1873 has been as follows:

Blossburg mines, '40 to '59.....	533,741
Fall Brook, '60 to '73.....	2,185,294
Morris Run, '53 to '73.....	3,160,341
Blossburg Coal Company, '66 to '73..	851,631

Seventy-five miles of railway, in an almost due northern direction, carries the coal from the Blossburg region to Seneca Lake, in New York State, where it is received into canal boats which deliver it throughout the State. The railway from the mines also connects with the Erie Railway at Corning, N. Y., thus affording another outlet for the coal from this region.

The most important seam is that known as the Bloss vein, a clean bed of pure coal, from 4½ to 5½ feet in thickness. As may be seen from the figures which we give of the tonnage of the three companies operating in this field, they are very influential in the matter of the coal supply of the State of New York, particularly. The coal is sold at a low and uniform price from year to year, and being used for blacksmith, puddling, locomotive and other steam uses, is not subject to the fluctuations common to Anthracite coal.

During the past two years the Fall Brook Company have been developing the same veins of coal at Antrim, and this locality promises to be a large coal producer. This Blossburg coal is used all over the North and North-west, for blacksmith purposes.

## BARCLAY.

The Barclay Coal Field next invites our attention; it is situated in Bradford County, Pa., some 36 miles south from Waverly, N. Y. The mines are owned by the Fall Creek Bituminous Coal Co., and the Erie Railway Co., (comprising the lands formerly of the Barclay, and the Towanda Coal Co's).

The coal from the Barclay region has been produced by the following parties:

Barclay Coal Co., 1856 to 1857.....	410,650
Towanda Coal Co., 1865 to 1873.....	756,372
Fall Creek B. C. Co., 1865 to 1873.....	280,510

The Erie Co., of course use the coal produced



at their mines; while that of the Fall Creek B. C. Co., is used by the iron works of Burden & Son, Griswold & Co., at Troy, N. Y.

#### MC INTYRE.

The McIntyre Coal Co., whose mines are at Ralston, Pa., on the Northern Central Railway, 54 miles from Elmira, N. Y., which gives them an outlet both north and south to a market, commenced operations in 1870, and have already done some 450,000 tons.

#### WESTMORELAND—CLEARFIELD.

The next regions in interest—those furnishing Bituminous coals from Westmoreland and Clearfield Counties—invite our attention. The Pennsylvania Railroad is the highway over which these coals find an outlet to the tide-water markets. The coal is used in many of the rolling mills, machine shops, and other industrial establishments along the line of the Pennsylvania Central and the Philadelphia and Reading Railroads, and the gas coals are brought to the shipping point of South Amboy, N. J., as it affords an opportunity of putting the coals into the New York and Eastern markets, this coal being used to a large extent by the various gas light companies of our large cities, and very highly esteemed.

#### BROAD TOP.

Then we pass on to the Broad Top coal field, which is situated in Huntingdon and Bedford Counties, Penn., and the product of which finds its way to tide via the Huntingdon and Broad Top Railroad, the Pennsylvania Central, &c., to Philadelphia, from which point it is distributed to various points eastward. The production began in 1856, and has increased quite rapidly. The coal is of rather a Semi-Bituminous nature, and is used for steam purposes and in glass works, being especially sought after for this latter purpose.

#### WEST VIRGINIA GAS COAL.

The West Virginia gas coal next invites our attention. This business opened in 1868, with receipts via the Baltimore and Ohio Railroad, and has been rapidly developed and increased. The coal is of good quality, and shipments are made to all the Northern and Eastern ports.

#### CUMBERLAND.

The next coal field is the George's Creek or

Cumberland, situated in Alleghany county, Maryland, it finds a connection with tide-water, via the Chesapeake and Ohio Canal, to Georgetown and Alexandria; and via the Baltimore and Ohio Railroad to Baltimore. The first coal sent to market from this region was in 1842. The producers number about 18 companies, and the coal is used extensively for Steam purposes, by Marine, and Locomotive Engines, every ocean steamer being a consumer of this coal.

It appears by the official reports which have been issued, that the amount of American Bituminous coal used on the sea-board in 1872, was as follows:

	Tons.
West Virginia Gas coal, .....	217,569
George's Creek Cumberland, .....	2,355,471
Broad Top Semi-Bituminous, .....	297,473
Other Bituminous via Penna. R. R. ..	2,067,524

Making a total of.....4,938,037

The imports of Bituminous coals from other countries, in 1872.

From Nova Scotia, .....	154,092
From other British N. A. possessions, ..	103,355
From Great Britain, .....	233,184

Making a total of.....490,631

Of the above, some 174,212 tons were received at San Francisco, mainly Australian.

Details of the production in tabular form, may be found further on.

A more particular description of the location, business, outlet, etc., will be found under the appropriate head in another portion of this work.

Dr. Geossmann, in 1856, gave the following analysis of the Blossburg coal: Fixed Carbon, 77.655; Volatile Matter, 13.795; Earthy Matter, 8.550.

G. R. Wilson, of Buffalo, N. Y., has been connected with the sale of Blossburg Coal since 1840; his brother, James R. Wilson, having been the pioneer in developing the resources of the Blossburg coal region.

The Sullivan County, Pennsylvania, Semi-Anthracite was first sent to market in September, 1871. During that year there was some 24,665 tons produced, and during the year 1872 the product amounted to 54,966 tons. An analysis of this coal gives the following result. Fixed Carbon, 89.29. Volatile Matter, 5.06. Ashes, 5.65.



## BITUMINOUS COAL

Statistics of the Bituminous Coal Trade of Western Pennsylvania, the business eastward over the Pennsylvania Railroad, the West Virginia Gas Coal Shipments, together with the Imports of Foreign Bituminous Coal into the United States.

	Monongahela Slackwa'r.	Pitts & Con's Railroad.	Little Saw Mill Railroad.	Phila. & Erie.	Penna. R. R. Eastward.	West Virginia Gas.	Imports.
1840	....	....	....	....	....	....	162,867
41	....	....	....	....	....	....	155,394
42	....	....	....	....	....	....	141,521
43	....	....	....	....	....	....	41,163
44	....	....	....	....	....	....	87,073
45	184,200	....	....	....	....	....	85,776
46	311,156	....	....	....	....	....	156,853
47	385,805	....	....	....	....	....	148,021
48	392,774	....	....	....	....	....	196,168
49	398,340	....	....	....	....	....	198,213
1850	491,918	....	....	....	....	....	180,439
51	490,850	....	....	....	....	....	214,774
52	585,233	....	....	....	....	....	183,015
53	628,654	....	....	....	....	....	231,508
54	693,278	....	....	....	....	....	252,865
55	889,360	....	....	....	....	....	287,408
56	353,364	....	....	....	....	....	293,507
57	1,158,939	....	....	....	247,491	....	360,712
58	1,027,866	....	....	....	201,795	....	396,628
59	1,131,467	11,294	....	....	209,907	....	403,928
1860	1,517,909	30,073	....	....	497,549	....	389,986
61	834,630	34,425	....	....	346,289	....	465,434
62	743,358	49,625	103,436	5,385	640,684	....	541,099
63	1,134,570	88,686	121,455	12,787	602,829	....	624,348
64	1,402,828	139,889	115,450	27,777	667,157	....	597,738
65	1,580,791	159,520	131,126	26,042	769,756	....	696,193
66	1,704,212	256,642	123,056	86,359	1,137,881	....	643,294
67	1,202,908	301,652	151,128	51,161	1,349,869	....	521,305
68	1,812,040	320,374	123,642	55,242	1,531,304	165,772	402,299
69	2,100,504	406,386	145,358	64,857	1,721,375	269,158	423,810
1870	2,303,856	469,450	155,001	51,445	1,889,089	249,879	420,683
71	1,944,852	565,014	158,565	45,690	1,787,181	189,763	443,955
72	2,291,220	....	157,102	83,885	2,067,524	217,569	490,631

696,777 tons and Clearfield Tonnage from 1862, the commencement, up to 1868. was tons.

## SEMI-BITUMINOUS COAL.

Statistics of the Semi-Bituminous Coal Trade of Pennsylvania and Maryland, each region from its commencement.

	Bloss- burg.	Barclay.	McIntyre.	Broad Top.	Belle- fonte.	Tyrone. & Clearfield.	Cumberl'd Md.	TOTAL.
1840	4,235	....	....	....	....	....	....	4,235
41	25,966	....	....	....	....	....	....	25,966
42	13,164	....	....	....	....	....	1,708	14,372
43	6,268	....	....	....	....	....	10,082	16,350
44	14,234	....	....	....	....	....	14,890	29,124
45	29,836	....	....	....	....	....	24,653	54,489
46	16,509	....	....	....	....	....	29,795	46,304
47	29,087	....	....	....	....	....	52,940	82,027
48	33,762	....	....	....	....	....	79,571	113,333
49	32,095	....	....	....	....	....	142,449	174,544
50	23,161	....	....	....	....	....	196,848	220,009
1851	25,000	....	....	....	....	....	257,679	282,679
52	20,000	....	....	....	....	....	334,178	354,178
53	45,507	....	....	....	....	....	533,979	589,486
54	70,214	....	....	....	....	....	659,681	729,895
55	73,204	....	....	....	....	....	662,272	735,476
56	70,669	2,295	....	42,000	....	....	706,450	821,414
57	94,314	6,265	....	78,813	....	....	582,486	761,878
58	41,894	17,560	....	105,478	....	....	649,656	824,588
59	48,592	30,143	....	130,595	....	....	724,354	813,684
60	96,918	27,718	....	186,903	....	....	788,909	1,000,448
1861	112,712	40,835	....	272,625	....	....	269,674	695,846
62	179,334	52,779	....	333,606	8,260	....	317,634	891,613
63	235,843	54,535	....	305,678	12,039	....	748,345	1,355,440
64	384,977	62,058	....	386,645	33,593	....	657,996	1,525,269
65	394,642	73,197	....	315,996	51,881	....	903,495	1,739,211
66	411,759	99,453	....	265,720	70,890	....	1,079,331	1,927,153
67	481,318	74,739	....	244,412	58,137	....	1,193,822	2,052,428
68	603,328	73,675	....	280,936	60,149	....	1,330,433	2,348,621
69	715,094	180,610	....	360,799	89,356	....	1,882,669	2,228,528
1870	733,035	273,335	17,808	313,425	85,276	410,523	1,717,075	3,550,477
71	815,079	378,335	106,130	319,625	79,984	542,896	2,345,153	4,587,202
72	849,262	382,842	171,427	297,473	68,988	431,915	2,355,471	4,557,378

## WEST VIRGINIA GAS COAL.

What is known as the West Virginia Gas Coal, is mined in Marion, Taylor, Ritchie and Preston counties in that state, and on the line of the Baltimore & Ohio railway. The coal is used for gas in the cities of the seaboard, and is much liked. The distances to Baltimore are as follows: From Clarksburg 301 miles; from Fairmount, 302 miles; from Newburg, 266 miles; from Tunnelton, 260 miles; from Cairo, 355 miles.

The veins are from six to eleven feet in thickness; Analyses of these coals have given the following results.

Clarksburg, Main Seam..	56.74	41.66	1.60
do. Cannel.....	49.21	45.43	5.36

The trade to the seaboard, began in the year 1868 with 165,772 tons. The business to date has been as below.

For the year 1868.....	165,772 tons.
For the year 1869.....	269,158 tons.
For the year 1870.....	249,879 tons.
For the year 1871.....	189,763 tons.
For the year 1872.....	217,569 tons.

In this region is found the Ritchie Mineral Resin. This mineral is an Asphalt or Semi-Asphalt, similar to the Albertite of Nova Scotia; it is also known as Grahamite. It is found at Cairo, on Hughes River, Ritchie County, 29 miles from Parkersburg, West Virginia, and 15 miles from the Baltimore and Ohio Railroad, over which it is shipped east and west, the Mining Co., owning the railroad connections. It is found in a perfectly vertical vein about  $4\frac{1}{2}$  feet in thickness, and  $\frac{3}{4}$  of a mile in length, and is mined by adits and chambers.

Grahamite has been used for a great many purposes but the chief sales of late have been to Gas Light Co's, for enriching the gas. It is remarkably free from sulphur and ash, is homeogenous; is not liable to decomposition and requiring no special arrangement in retorting, produces a good coke.

Its photometric value is found to be 32 candles, and in this respects excels the famous Boghead Cannel coal.

An analysis has proved it to contain 55 per cent volatile matter, 42 per cent. fixed carbon, and 3 per cent ash, only 2 per cent. less volatile matter than Albertite, the richest mineral yet imported for gas purposes.

In addition to the outlet eastward via the B. & O. R. R., there is the Parkersburg route due west, crossing the Monongahela river at Clarksburg, and thence to the Ohio river at Parkersburg; and the Wheeling route north-westward, crossing the Monongahela at Fairmont, thence down the creek to the Ohio, and thence up the river to Wheeling. Both these branches enter the main coal measures near the crossing of the Monongahela above named, and traverse them to the Ohio. At Clarksburg and northward, down the valley of the Monongahela, is one of the richest coal regions of West Virginia. One of the beds in the neighborhood of this town measures from ten to twelve feet in thickness, with a thinner bed of more highly Bituminous nature underlying; from some distance above Clarksburg, they may be followed with scarcely an interruption throughout the whole valley of the Monongahela northward to Pittsburgh.

The charges on the coal from this region to Baltimore, amount to \$5 per 2000 lbs; a drawback of 50 cents per ton is allowed on shipments to northern and eastern ports.

## BROAD TOP REGION.

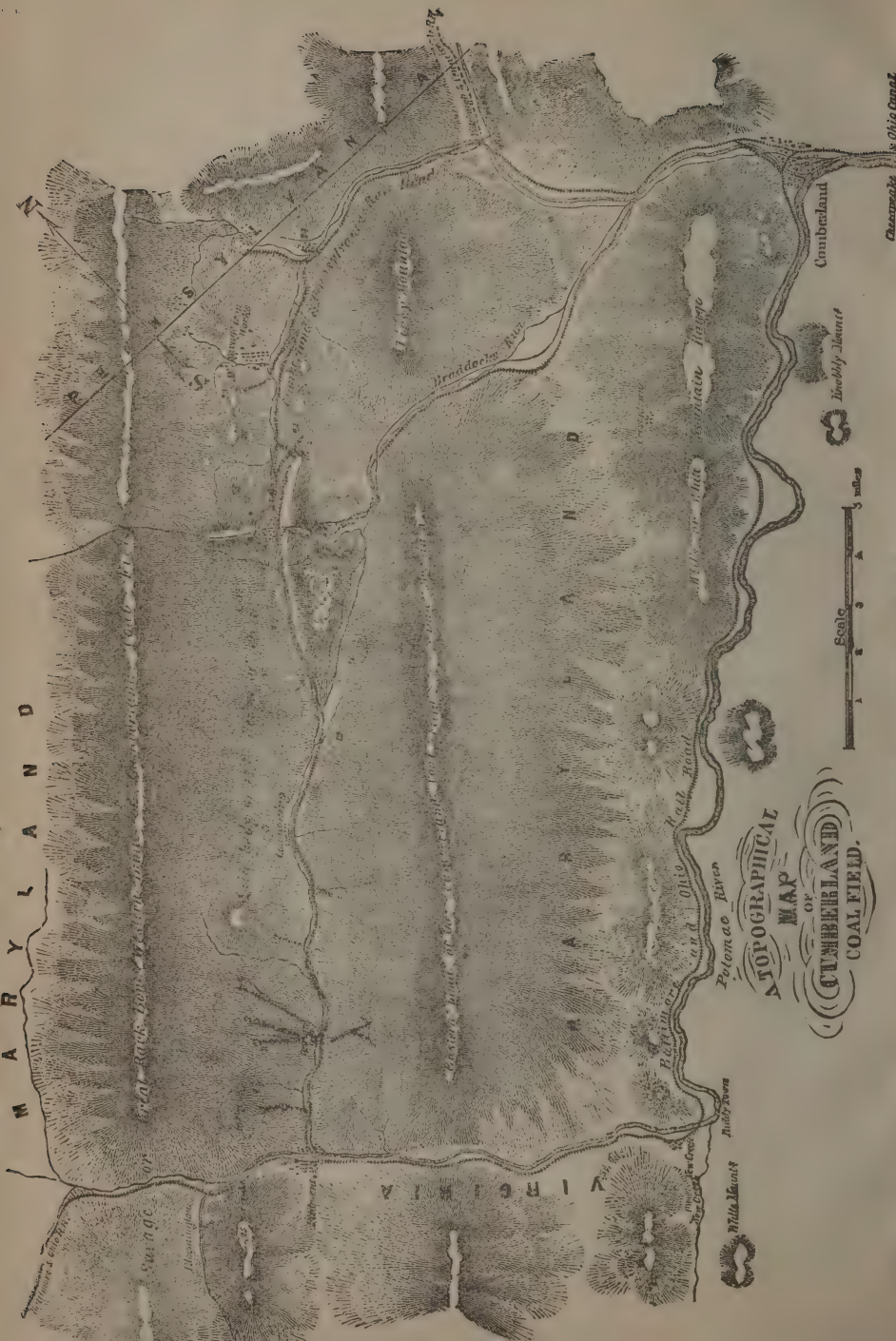
At a point on the Pennsylvania Railroad, 203 miles west from Philadelphia, is the town of Huntingdon. From thence, in a southwesterly direction, branches the Huntingdon and Broad Top Mountain Railroad, which is to Mount Dallas 45 miles in length. At Saxton, 24 miles on the H. & B. T. road, is a branch to the coal mines of the Broad Top region, running in a zigzag direction for about ten miles to Broad Top city. At Riddlesburg, five miles beyond Saxton, is another branch road, in to Fulton, a distance of five miles from the main line. The H. & B. T. road was opened about 1856, during which year some 42,000 tons of coal from this region was sent to market. The trade has increased, although the yearly amount produced has fluctuated very considerably, the largest year's business previous to that of 1873, being in 1864, when 386,645 tons were mined.

The coal is semi-bituminous in its nature and has been largely used for glass works, steam-raising under marine and stationary engines, &c.

The larger seam which is worked in this region ranges from five to ten feet in thickness and the lesser ones from two to three. An analysis prepared for the Pennsylvania Railroad







*Chesapeake Bay*

REFERENCES TO NUMBERS ON ABOVE MAP.

- |                                  |                            |                               |
|----------------------------------|----------------------------|-------------------------------|
| 1. Franklin Coal Co.,            | 5. Potomac Coal Co.,       | 16 & 17. New Central Coal Co. |
| 1 1/2. George's Creek Mining Co. | 6 & 14. Maryland Coal Co.  | 18 & 19. Consolidation Co.    |
| 2. American Coal Co.             | 7. Annapolis Coal Co.      | 20. Consolidation Co.         |
| 3. Annapolis Coal Co.            | 8. Annapolis Coal Co.      |                               |
| 4. Annapolis Coal Co.            | 9. Consolidation Co.       |                               |
|                                  | 10. Hampshire & B. O. Co.  |                               |
|                                  | 11. Consolidation Co.      |                               |
|                                  | 12 & 13. Consolidation Co. |                               |
|                                  | 14. Consolidation Co.      |                               |
|                                  | 15. Consolidation Co.      |                               |

company, gave the following results: Water, 0; Volatile Matter, 17.55; Fixed Carbon, 65; Ash, 7.50.

The yearly production in this region, since beginning, has been as follows:

1856....	42,000	1865....	315,996
1857....	78,813	1866....	265,720
1858....	105,478	1867....	244,412
1859....	130,595	1868....	280,936
1860....	186,903	1869....	360,778
1861....	272,625	1870....	313,425
1862....	333,606	1871....	319,625
1863....	305,678	1872....	297,473
1864....	386,645		

List of operators and names of their collieries this region.

P. Ammerman, Agt.,	Cook Vein,
George Mears, Agt.,	Carbon,
Fishers & Miller,	Fisher,
George Mears, Agt.,	Broad Top,
Reakirt, Bro. & Co.	Mooredale,
George Mears, Agt.,	Union,
J. M. Bacon,	Blair,
J. M. Bacon,	Dudley,
R. U. Jacob & Co.,	Barnett,
Berwind & Bradley,	Barnett Pane,
Berwind & Bradley,	Powelton,
J. Whitehead,	Crawford,
J. Whitehead,	Cumberland,
J. M. Bacon,	Howe,
Kemble C. & I. Co.,	Mt. Equity,
Kemple C. & I. Co.,	Duval,
R. B. Wigton,	Cunard,
Richard Langdon,	Mount Eagle,
William Scott,	Scott,
Andrew Gleason & Co.,	Consolidation,

The charges to Philadelphia are \$3.55 per ton of 2000 lbs, with a drawback of 75 cents per ton, on shipments to the north and east; making the net toll in such cases equal to \$3.15 gross ton.

#### THE CUMBERLAND, Md., REGION

What is known as the Cumberland, or George's Creek coal field, is situated in Allegheny County, at the western extremity of the State of Maryland. The connections with the water markets are via the Baltimore and Ohio Railroad, from the towns of Cumberland and Piedmont, 178 and 206 miles west from Baltimore; via the Chesapeake and Ohio canal, following the Potomac River, to Georgetown,

and Alexandria, 191 miles from Cumberland.

The coal is Bituminous, of superior quality, and the vein worked is from seven to fourteen feet in thickness, the full extent of the vein being seldom taken out, the roof being insecure. The mines are located at various distances from the shipping ports, say from  $1\frac{1}{2}$  to 20 miles from Piedmont, and from 11 to 33 from Cumberland.

Prof. J. T. Hodge gives the estimated number of acres of coal lands in this region as 17,282.

The Consolidation Coal Co., are the largest producers in the region, and own the Cumberland and Pennsylvania, and the Cumberland Branch railroads.

The Cumberland Coal Field was enabled to send its product to a market in 1842, by the branches of the Baltimore and Ohio Railroad, made into this field; 1,708 tons were sent in that year. In 1850, the Chesapeake and Ohio canal was finished to Cumberland, Md; and by it 4,042 tons were shipped in that year. What is known as the Frostburg region, of this field, was the only producer up 1853. During that year, 73,725 tons were sent by the George's Creek branch road from the Piedmont Region.

The production of Cumberland coal from 1842 to 1872, inclusive, was 21,253,685 tons, carried to market by the following routes, via

Baltimore and Ohio Railroad.....	14,191,564
Chesapeake and Ohio Canal.....	7,040,100
Pennsylvania Railroad.....	22,021

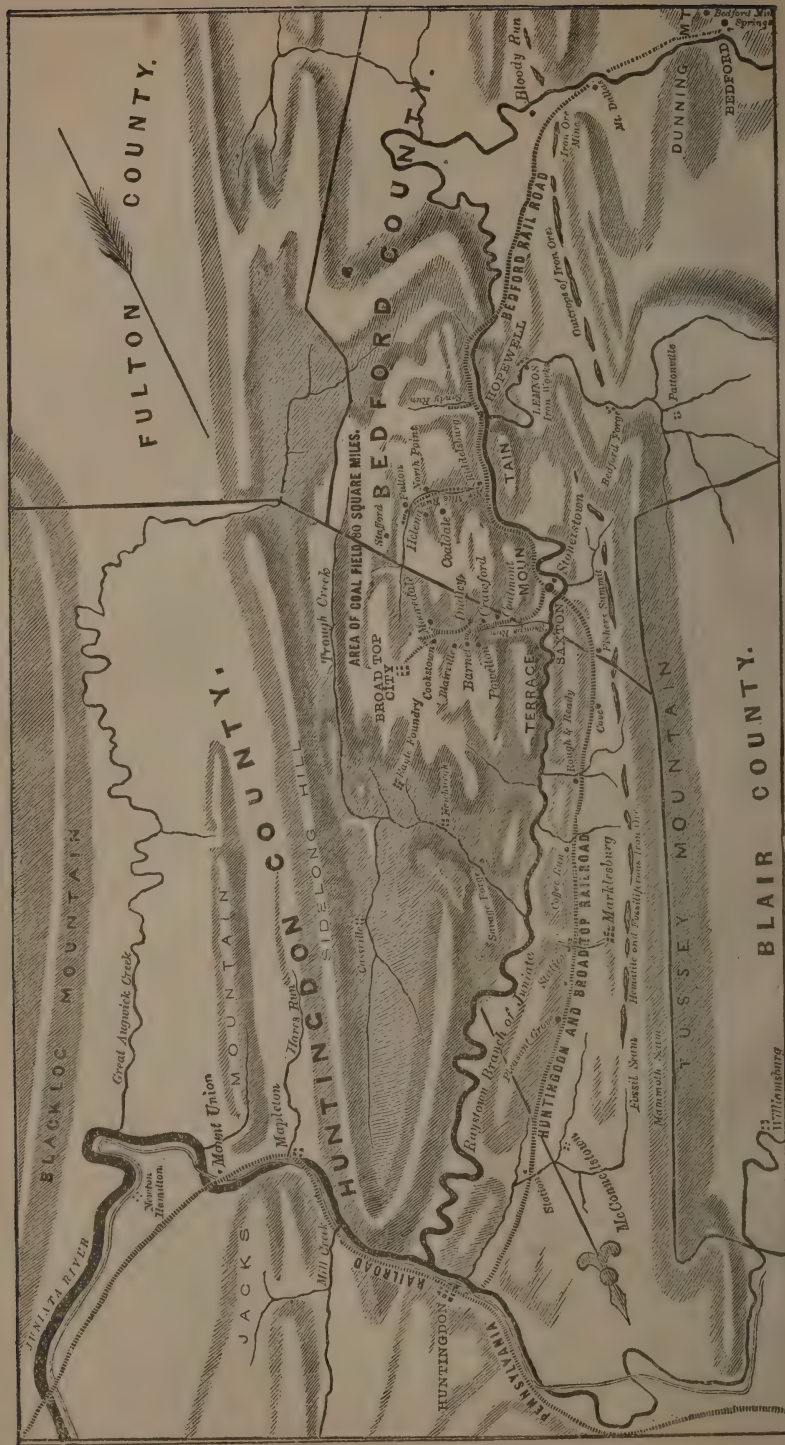
21,253,685

The Frostburg region to January 1, 1873, had furnished 17,704,690 tons. The Piedmont region to same date had furnished 3,548,996 tons. During the year 1872, a branch connecting with the Pennsylvania Railroad was finished, and 22,021 tons were carried over it.

The Cumberland and Pennsylvania Railroad carries the bulk of the coal out of the Frostburg region, having carried to Jan. 1873, 13,727,194 tons. The Cumberland branch road carrying 3,977,596 tons.

From the Piedmont region, the Hampshire and Baltimore Company, and the Virginia Coal and Iron Company, connect by their own tramroads with the B. & O. Railway. The business done has been as follows: during the years 1853





Map of the Broad Top Coal and Iron Region.

After J. P. Lesley.]

to 1863, by the George's Creek branch railway, 2,190,673 tons. From Hamp. and Balt. Co's. Mines 1855 to date 1,163,628 tons. From Virginia Coal and Iron Co. Mines 1870-1-2 there was shipped 194,684 tons.

From what has been written above, it will be seen that the bulk of the George's Creek Cumberland coal passes over the Cumberland and Pennsylvania Railroad, which is 32 miles in length. The rates charged are as follows:—4 miles and under, 5 cents per ton per mile. 5 miles and less than 10, 4 cents per ton per mile; over 10 miles 3 cents per ton per mile.

The charges for coal from the main points in this region, are as below:

From Cumberland by C. & O. Canal, to Georgetown, D. C. \$1.86 per ton of 2,240 lbs. To Alexandria, Va., \$1.97 per ton of 2,240 lbs. From Piedmont via B. & O. R. R. to Baltimore, Md., \$2.70 per 2,000 lbs. and 4 cents per gross ton for use of cars or say \$3.06½ for the gross ton. From State Line, via Pennsylvania R. R. to Greenwich, on the Delaware, \$3.58 per 2,000 lbs. From State Line, via Pennsylvania R. R. to South Amboy, \$3.73 per 2,000 lbs. It is estimated that the cost of delivering coal by either route, to the New York market is equal.

The average price of this coal at Baltimore, the freight thence to Boston, and the price at which it was delivered at Boston during the past 20 years has been as below:

Year.	Average for year.	Av. freight to Boston.	Av. cost delivered in Boston.
1853.....	\$3 30	\$2 80	\$6 10
1854.....	4 05	2 25	6 30
1855.....	3 89½	2 17	6 06
1856.....	3 75	2 37	6 12
1857.....	4 28	1 84	6 12
1858.....	3 70	1 73	5 43
1859.....	3 63	1 83	5 46
1860.....	3 49	2 55	6 04
1861.....	3 44	2 25	5 69
1862.....	4 23	2 42	6 65
1863.....	5 57	3 23	8 85
1864.....	6 84	3 39	10 23
1865.....	7 57	3 79	11 36
1866.....	5 94	3 53	9 47
1867.....	4 97	2 63	7 65
1868.....	4 71	3 21	7 92
1869.....	4 97	2 83	7 80
1870.....	4 72	2 64	7 36
1871.....	4 72	2 73	7 45
1872.....	4 66	3 06	7 72
1873.....	4 84	3 17	8 01

A description of this coal region would hardly be complete without some account of the quality of the coal produced. At Colt's Armory in Hartford, it has been found that for steam generating it is better and cheaper than Anthracite. The Sup't of the U. S. Armory at Springfield, Mass., made very thorough tests; each variety of three different classes of coal was used for six consecutive days, with the following reported results:

	Lacka wanna.	Pittston.	Cumberland.
Pound per h. p. per hour	4.01	4.02	3.03
Cost per gross ton	\$8.05	\$7.85	\$9.10
Cost per horse power	15 cts.	14 cts.	12 cts

And it is therefore alleged that Bituminous coal is the more economical fuel as a steam generator, making more heat and creating more power than harder coals.

The parties engaged in mining in this region are as below:

Borden Mining Co.  
Consolidation Coal Co.  
Hampshire and Baltimore Coal Co.  
George's Creek Coal and Iron Co.  
New Central Coal Co.  
Maryland Coal Co.  
American Coal Co.  
Atlantic and George's Creek Coal Co.  
Piedmont Coal Co.  
Swanton Co.  
Potomac Coal Co.  
George's Creek Mining Co.  
Franklin Coal Co.  
Blæen Avon Coal Mining Co.  
New Reading.

The following is the total Cumberland coal trade by railroad and canal:

Years.	Total by B. & O. R. R.	Total by C. & O. Canal.	Aggregate.
1842.....	1,705	.....	1,705
1843.....	10,082	.....	10,082
1844.....	14,890	.....	14,890
1845.....	24,653	.....	24,653
1846.....	29,795	.....	29,795
1847.....	52,900	.....	52,900
1848.....	79,571	.....	79,571
1849.....	142,449	.....	142,449
1850.....	192,806	4,042	196,848
1851.....	174,702	82,978	257,679
1852.....	268,459	65,719	334,178
1853.....	376,219	157,760	533,979
1854.....	503,836	155,845	659,681
1855.....	478,486	183,786	662,272
1856.....	502,330	204,120	706,450
1857.....	465,912	116,574	582,486
1858.....	395,405	254,251	649,656
1859.....	426,512	297,842	724,354
1860.....	493,031	295,878	788,909
1861.....	172,075	97,599	269,674
1862.....	213,950	98,634	312,584
1863.....	531,555	216,792	748,345
1864.....	399,354	258,642	657,996
1865.....	560,293	343,202	903,495
1866.....	736,153	343,178	1,079,331
1867.....	735,669	453,163	1,188,832
1868.....	848,113	482,325	1,330,438
1869.....	1,230,518	652,151	1,882,669
1870.....	1,112,938	604,137	1,717,075
1871.....	1,494,814	850,339	2,345,153
1872.....	1,537,368	816,103	2,353,471



The Cumberland basin furnishes the most superior coal for steam generating purposes of any yet discovered, and the difficulty is that the field of supply is limited; therefore, when we find a district of country producing the same quality of coal, it is deserving of notice.

#### SOMERSET COUNTY, PENNA.

The newly developed coal field known as the Myer's Mills or Salisbury region is situated on the northern boundary of Maryland, and in Somerset County, Penna., and is an extension of the Cumberland coal basin. It is of the same quality and will yield an equal quantity per acre. It is eleven miles from Frostburg, Md., and on the Pittsburgh, Washington and Baltimore Railroad. The area of the great or fourteen foot bed is about 5,000 acres. There is but one company at present engaged in coal mining in this region, the "Keystone," it commenced work during the present year and is now shipping from 200 to 300 tons per day. The property is advantageously situated for the shipment of its production, and the rate of transportation is very favorable, being but \$3.08 per ton of 2,240 lbs. from the mines to Locust Point, Baltimore, which is somewhat of an advantage over the coal shipped from the Cumberland region.

Myers mills is 217 miles from Baltimore, and 112 miles from Salisbury, by present routes.

Professor J. P. Lesley in a highly flattering report on the coal resources of this region says: "The upper coal beds which give to the Salisbury basin, its exceptional importance have been entirely swept away from the surface of Somerset County, except in two places.

1.—They remain in the long narrow ridge at Salisbury.

2.—They remain in the centre part of the Frostburg or Cumberland Basin.

The "Pittsburgh bed", the "Connellsville bed", the Irwin "Gas Coal bed", the Greensburg "great bed", the big bed at Latrobe and Saltzburg are all one, and the same coal bed, the same as the lowest of the Salisbury beds, the same as the famous George's Creek bed in the middle of the Cumberland Basin.

This is the bed which furnishes almost all the coke used at Pittsburgh, and the larger part of the raw coal of the Ohio River trade, and is used to the extent of nearly two million tons in

Baltimore, Philadelphia, New York, and Ocean and Coasting Steamers.

The section of the southern half of the Salisbury basin (upper) coal measures may thus be stated.

• Great Limestone.....	10 feet
Sewickly coal bed (slaty).....	10 "
Interval (soft shales).....	44 "
Redstone coal bed?.....	6 "
Interval (shales).....	10 "
Pittsburgh coal bed (with 2 ft. parting).....	18 "
Interval two small coal beds.....	64 "
Salisbury coal bed, over.....	4 "
Hence down to the level of Castleman's River.....	55 "

The Salisbury basin is nine or ten miles long, and one or two miles wide, yet there is an enormous quantity of coal to be won very easily, it is estimated at nearly one hundred million tons from the great Pittsburgh bed alone available calculating for pillars waste, etc, etc

#### MONONGAHELA REGION.

This region may truly be called the perfection of a coal region. The Monongahela river for 95 miles possesses every advantage for the production of coal, and it is not surprising that the tonnage is so immense. The seam worked is of uniform thickness, and yields a pure coal being used for Iron making, steam raising, and for gas and domestic purposes.

By means of its slack-water navigation, the Monongahela river is made navigable at all seasons of the year, and boats carrying 800 tons are passed down. The city of Pittsburgh is supplied mainly by railroad, and the large portion of the coal coming down by the river is run down the Ohio and Mississippi to the lower markets. The boats in use are known as "broad horns" carrying 20,000 bushels, "bar ges", carrying 11,000 bushels, and "flats" carrying 2,000 bushels. In this market the "bushel" is the usual measure in making quotations, and reporting the coal production.

#### WESTMORELAND GAS COAL.

This well known coal is mined near Penn and Irwin stations on the Pennsylvania Railroad in Westmoreland county; the distance from Philadelphia being 332 miles. The coal mined is the great Pittsburgh bed of Bituminous coal; the companies operating in this region are large and influential, doing a business of about a million tons annually; the coal is used in every seaboard city for gas purposes.

and commands a high price; the shipping point is South Amboy, N. J.

The Greensburg basin is about 15 miles long, and its greatest breadth is little less than ten miles.

#### MERCER COUNTY, PENNA.

The most important coal region in north west Pennsylvania (running over into Eastern Ohio), that of Mercer County. The coal produced is what is known as the Splint or Block coal, and is used in the raw state for smelting iron; the principal location of this peculiar coal, is on the line of the Erie and Pittsburgh Railroad, about 75 miles south from Erie, and it finds a way to market by this route and the Beaver and Erie canal. The beds vary from two to five feet in thickness, and some half million tons are annually produced.

#### WEST BRANCH REGION.

The Philadelphia and Erie railroad runs across the northern ends of five coal basins. There is no important development of the first two. In the third, at 67 miles west of Wilkesport is the Wistar Mountain Co's mines; at 97 miles, are the works of the Cameron Co. In the fourth, at 117 miles west of Williamsport, is St. Mary's, and Benzinger at 125 miles, the Kersey and Daguschahonda, at 128 miles, the Shawmut branch road comes in. In the fifth, at 138 miles, are the Johnsonburg mines; the completion of the Buffalo and Washington railroad will give the coals of these basins an outlet to a profitable market.

#### SNOWSHOE REGION.

This region is located in Centre County, Pennsylvania, and covers an area of about eight miles in length, and some four miles in breadth, and is situated on both sides of Beach Creek. The coal finds an outlet to markets, by the Alleghenese and Snowshoe Railroad; a connection of the Pennsylvania Railroad, it being 47 miles from Snowshoe to Tyrone on the main line; its other Railroad connections are to the roads in the interior.

At present, there is one company mining here, and they do a yearly business of about 100,000 tons. The coal is Semi-Bituminous, of good quality, and is used for steam and in rolling mills. Professor Roger's gives it 78.8 of coke, and 21.2 of vol. matter and ashes.

#### CLEARFIELD REGION.

The Tyrone and Clearfield branch of the Pennsylvania Railroad is 41 miles in length from Tyrone to Clearfield, in a northwest direction from Tyrone.

At 16 miles from Tyrone we find the first coal mines, those of the Powelton Company, and at Osceola Mills three miles beyond, is a branch road known as the Franklin, six miles in length, running to the Clearfield, Moshannon, Beaverton, Eureka, Sterling and Franklin collieries. A mile or so further we pass the works of the Enterprise Coal Co., beyond is a branch road leading into the works of the Mapleton Coal Co., and the Reading bank, owned by James Hale, of Osceola. At Phillipsburg, 24 miles from Tyrone, are the works of the Derby Coal Co. From this place a road branches off to the works of the Decatur Coal Co., and the Morrisdale Coal Co., some three miles up Moshannon Creek.

The development of the coal interest in the Clearfield region appears to be but in its infancy, but it is expected that the business will increase fastly in a few years.

From Tyrone to Philadelphia is 224 miles, and to South Amboy 293 miles. As showing the production of this region we append the following figures: During 1871 the shipments were 542,896 tons, and in 1872 431,915 tons.

The Pennsylvania Railroad Company own the railroads, the shipping wharves, and all the means of access to the markets of the Atlantic Seaboard, although in some few instances the mining companies own their own cars, which are moved by the Railroad Co., at a reduction in the rate of transportation per ton per mile. Of course the advantage of the connection with a railroad of such magnitude, and wonderful ramifications and communications gives the miners in this region great facilities.

The coal sells readily, and where it has been used, is liked as well as the other varieties of Semi-Bituminous coal, that are disposed of in the markets on the Atlantic Seaboard, we append a list of the companies engaged in the mining of coal in this region, which is known as the "Clearfield County," and also as the "Phillipsburg" region.

Names of Mines.	Operators.
Powelton.	Powelton Coal & Iron Co.

Clearfield,	Clearfield Coal & Iron Co.
Moshannon Coal Co.	Moshannon Coal Co.
Beaverton,	Kittaning Coal Co.
Sterling,	Sterling Coal Co.
Eureka,	White & Lingle.
Franklin,	Kittaning Coal Co.
Penn.	Blattenburgh & Hines.
Enterprise, No. 1,	Enterprise Coal Co.
Enterprise, No. 2,	Enterprise Coal Co.
Mapleton,	Mapleton Coal Co.
Reading,	Jas. P. Hale & Co.
Derby,	Derby Coal Co.
Decatur,	Decatur Coal Co.
Morrisdale,	Morrisdale Coal Co.

### RAILROADS OF PENNSYLVANIA.

The following statistics of the coal carrying railways of the State of Pennsylvania, from the official reports of the Auditor General, for the year 1872, will be found of great interest and value.

We give the length of the road, in the State of Pennsylvania; the toll charges, per 2,000 lbs. per mile, and the coal tonnage.

**ALLEGHENY VALLEY.**—Pittsburgh to Oil City, 132 miles; carried 435,220 tons of Bituminous coal. The charges are  $1\frac{1}{2}$  cents on through coal, and three cents on local coal.

**ATLANTIC AND GREAT WESTERN.**—(Salamanca, N. Y. to Dayton, Ohio, 387 $\frac{1}{2}$  miles,) in Pennsylvania 92 $\frac{1}{2}$  miles; carried 37,037 tons of Anthracite, and 961,825 tons of Bituminous. Charges 1 to  $1\frac{1}{2}$  cents on through coal, and 1 to 3 cents on local coal.

**BARCLAY.**—(leased to Erie Railway,) Towanda to Barclay, 16 miles. Carried 382,842 tons of Bituminous coal.

**BELLEFONTE AND SNOWSHOE.**—21 $\frac{1}{2}$  miles, from junction of Bald Eagle road to Snowshoe. Carried 68,988 tons of Bituminous coal. Charges 2 $\frac{2}{5}$  cents on through coal.

**CATAAQUA AND FOGELSVILLE.**—20 miles from Cataaqua to Ritterhouse Gap. Carried 52,363 tons of Anthracite, and 7,603 of Bituminous coal. Charges 2 $\frac{1}{2}$  cents on through coal, and 3 $\frac{1}{2}$  cents on local coal.

**CATAWISSA.**—94 miles, from Williamsport to Tawenend. Carried 16,872 tons of Anthracite. Charges  $1\frac{1}{4}$  cents on through coal, and  $1\frac{1}{8}$  on local coal.

**CLEVELAND AND PITTSBURGH.**—15 miles in

Pennsylvania; carried 904,641 tons of Bituminous coal; 01.90 cents per ton of 2,000 lbs. per mile, was the average rate on coal in 1872.

**CUMBERLAND VALLEY.**—68 miles in Pennsylvania; carried 99,052 tons of coal; charges cents per mile.

**DELAWARE, LACKAWANNA AND WESTERN.**—115 miles from Delaware River to New York State line; carried 2,914,265 tons of Anthracite and 5,814 of Bituminous coal.

**DUNKIRK, WARREN AND PITTSBURGH.**—1 miles from Dunkirk, N. Y. to Warren, Penna. 12 $\frac{1}{2}$  miles in Penna.; carried 7,504 tons of coal. Charges .0110 cents per ton.

**ELMIRA AND WILLIAMSPORT.**—78 miles, from Elmira, N. Y. to Williamsport, Penna., 6 miles in Pennsylvania; carried 253,961 tons of coal; charges  $1\frac{1}{2}$  cents per ton;

**ERIE.**—42 $\frac{1}{2}$  miles in Pennsylvania, carried 2,989,680 tons coal.

**ERIE AND PITTSBURGH.**—81 miles, from New Castle, to Girard, Penna.; carried 503,180 tons coal; charges 1 cent on through,  $1\frac{1}{2}$  cents on local coal.

**HUNTINGDON AND BROAD TOP MOUNTAIN.**—4 miles, from Huntingdon to Mt. Dallas; carried 1,864 tons Anthracite, and 318,372 tons Bituminous; charges .019 $\frac{10}{100}$  cents on through, and 24 $\frac{5}{100}$  cents on local coal.

**LACKAWANNA AND BLOOMSBURG.**—80 miles from Scranton to Northumberland; carried 1,907,540 tons Anthracite; charges 2 cents on through, and 2 $\frac{1}{2}$  cents on local coal.

**LAKE SHORE AND MICHIGAN SOUTHERN.**—4 miles in Pennsylvania, carried 34,926 tons Anthracite, and 238,185 tons Bituminous. Charges 13 $\frac{10}{100}$  cents on coal.

**LAWRENCE.**—17 miles, from Lawrence Junction to Youngstown, Ohio; carried 92,767 tons coal; average charges 3 cents.

**LEHIGH AND SUSQUEHANNA.**—105 miles, from Phillipsburg, N. J. to Union Junction, Penna.; carried 2,527,069 tons Anthracite; charges 11 $\frac{100}{100}$  cents on coal.

**LEHIGH VALLEY.**—101 miles, from Phillipsburg, N. J. to Wilkesbarre, Penna.; carried 4,312,132 tons Anthracite, and 27,310 tons of Bituminous coal; charges 2 cents on coal.

**LITTLE SAW MILL RUN.**—3 miles, from Banksville to the Ohio River; carried 157,102 tons Bituminous coal.



NORTHERN CENTRAL.—138 miles, from Baltimore, Md., to Sunbury, Penna., 102 miles in Pennsylvania; carried 889,230 tons coal; average rate charged 0.174 cents.

NORTH PENNSYLVANIA.—556<sup>19</sup> miles, from Philadelphia to Bethlehem; carried 386,464 tons Anthracite, and 4,431 Bituminous.

OIL CREEK AND ALLEGHENY RIVER.—120 miles, Corry to Irvineton: carried 179,519 tons coal; charges 1 $\frac{1}{2}$  cents on through, and 3 cents on local.

PENNSYLVANIA.—3549<sup>10</sup> miles in Pennsylvania; carried 2,892,845 tons Bituminous, and 76,226 tons Anthracite; average rate  $\frac{4.153}{10.000}$

PENNSYLVANIA COAL.—47 miles, from Hawley to Port Griffith; carried 1,365,038 tons Anthracite coal on company's account.

PENNSYLVANIA AND NEW YORK.—1043<sup>10</sup> miles, Elkesbarre to Erie Junction; carried 650,659 tons Anthracite, and 376,941 Bituminous; charges 1 $\frac{1}{4}$  to 1 $\frac{1}{2}$  on through coal, and 2 $\frac{1}{4}$  cents on local.

PHILADELPHIA AND ERIE.—287 $\frac{1}{2}$  miles, Erie to Sunbury; carried 782,295 tons Anthracite, and 83,885 tons Bituminous; average rate 1<sup>19-100</sup> cents on coal.

PHILADELPHIA AND READING.—1,385<sup>3-10</sup> miles, including sidings and leased roads; carried 420,511 tons Anthracite, and 507,175 tons Bituminous; average charges on coal 1<sup>54-100</sup> cents.

PHILADELPHIA, WILMINGTON AND BALTIMORE.—18 miles in Pennsylvania; carried 32,892 tons coal, 1 $\frac{1}{2}$  cents on coal.

PITTSBURGH, CINCINNATI AND ST. LOUIS.—Pittsburgh to Columbus, 193 miles, 35 $\frac{1}{4}$  miles in Pennsylvania; carried 432,226 tons of coke; charge 1 cent on through, and 18<sup>10</sup> cents on local.

PITTSBURGH AND CONNELLSVILLE.—142 miles in Pennsylvania. *No statement of coal tonnage.* Charges 1 $\frac{1}{4}$  cents on through coal.

PITTSBURGH, N. W. AND CHICAGO.—49 miles in Pennsylvania; carried 511,012 tons; charges 1 cent on through, and 1 $\frac{1}{4}$  on local coal.

SHENANGO AND ALLEGHENY.—32 miles; carried 52,460 tons Bituminous; charges 3 cents on through, and 5 cents on local.

SUMMIT BRANCH.—20 miles, Millersburg to Hiramstown; carried 512,502 tons Anthra-

cite; charges 32<sup>10</sup> cents on through, and 5 cents on local.

TIOGA.—306<sup>10</sup> miles; carried 845,116 tons Bituminous; charges 2 $\frac{1}{2}$  cents on through, and 5 cents on local.

WILMINGTON AND READING. 52 miles in Pennsylvania; carried 68,267 tons Anthracite, and 43,143 tons Bituminous; charges 2 cents on through, and 3 cents on local coal.

### DISTANCES TO MARKET.

The following are the distances from a portion of the American coal fields, to the different tide-water markets:

	BY	MILES.
From Pottsville to New York,	Canal	226
" " " "	Rail & Water	196
" " " to Philadelphia	Canal	106
" " " " "	Rail	93
" Mauch Chunk to N. Y.	Lehigh Canal	172
" " " " "	Morris Canal	147
" " " " "	Rail	126
" " " to Philadelphia	Canal	124
" " " " "	Rail	89
" Carbondale to New York	Rail & Canal	208
" Scranton to " "	Rail	143
" Wilkesbarre to " "	Rail	192
" " Philadelphia	Rail & Canal	168
" " M. Chunk	Rail	55
" " Baltimore	Rail & Canal	260
" " " "	Canal	246
" Shamokin to " "	Rail & Canal	200
" " " " "	N. Cent. R.	158
" Cumberland to " "	Rail	206
" " Georgetown	Canal	184
" " Alexandria	Canal	191
" Broad Top to Philadelphia	Rail	242

### COAL PRODUCTION OF THE GLOBE.

BY JAMES MACFARLANE, AUTHOR OF "THE COAL REGIONS OF AMERICA."

Year.	Countries.	Production.
1872.	United States.....	41,000,000
1872.	Nova Scotia.....	880,950
1872.	Great Britain.....	123,386,758
1872.	France.....	15,000,000
1871.	Belgium.....	13,773,176
1870.	Austria.....	6,443,575
1870.	Prussia.....	23,316,238
1862.	Poland.....	112,500
1867.	Russia.....	259,521
1869.	Spain.....	593,033
1868.	India.....	547,971
1869.	New South Wales.....	919,522
Total reports.....		226,233,244
Chili, China, New Zealand, Pacific coast, &c., &c., estimated.....		1,800,000
Total of the Globe.....		228,033,244





## COAL IN AUSTRIA.

Austria contains such large deposits of coal wealth that naturally she may be regarded as one of the richest coal-producing nations of Europe. Silesia, Galicia, and Bohemia are said to contain deposits of coal sufficient to supply the whole consumption of Europe for several centuries; but this, we fear, is rather tall talk, although the coal wealth of the districts named is doubtless very considerable. It is only recently that this coal wealth has been turned to profitable account. Industry is not in a very advanced state in Eastern Europe, and the scattered population of the districts in question have only been recently united with each other and with Central Europe by the great and ever-extending railway net-work of the present epoch. During the last 20 years a not unimportant material progress has been achieved, however, especially in Moravia, Silesia, and Bohemia, where a dense and laborious population has resolutely embarked in the great industrial movement of modern times.

In 1818 the production of coal in Austria and Hungary was 84,450 tons; in 1828 it was 53,950 tons; and in 1838, 299,100 tons. The progress made in the 20 years was not very marked, but it has since been greatly accelerated, the production having risen in 1848 to 38,000 tons; in 1858 to 2,598,800 tons. Below will be found the details from the year 1860 up to the present time.

Year.	Pit Coal.	Lignite, &c.
1860.....	1,739,455	1,389,023
1861.....	2,025,323	1,604,339
1862.....	2,252,951	1,811,767
1863.....	2,278,342	1,805,477
1864.....	2,265,540	1,896,158
1865.....	2,532,933	1,999,483
1866.....	2,416,783	1,952,799
1867.....	2,967,963	2,477,428
1868.....	3,334,065	2,864,962
1869.....	3,493,209	3,191,952
1870.....	3,483,250	2,960,325
1871.....	5,355,918	
1872.....	3,886,982	

The figures of the Lignite in 1871 and 1872 have not been received.

Analysis of Moshannon Creek Coal, Clearfield County, Penna.: Fixed Carbon, 71.56; Ashes 6.56; Volatile Matter 18.57; Water 2.46; Sulphur 0.85.

## COAL IN FRANCE.

There are fifty-nine small coal basins in France, but the most important are those of the Loire and those of St. Etienne, which are the best known and comprise about 50,000 acres.

The development of the coal fields surrounding Saint Etienne, Rive-de-Gier, and Givors is of comparatively recent date. Two centuries ago, St. Etienne was a small hamlet, inhabited by a small community of craftsmen skilled in the arts of cutting tools forging arms, and weaving ribbons. As for the other two places, they had neither a local habitation nor a name. The northern basin of the French coal field, which is really a continuation of that of Belgium, has its chief and busiest centres about Dinain, Anzin, Valenciennes, and the Pas-de-Calais. The more important of the French collieries in the department of the Saone-et-Loire, are those of Epinac and Blanzay; but we must not omit to mention Creuzot, which, although a desolate valley a century ago, is now, by its collieries and ironworks, giving active employment to an industrial army of 10,000 strong. Among the more recent developments of the coal fields of France may be mentioned those of Alais Grand Combe; Besseges and Portes in the Gard, which, although unrecognised twenty-five years ago, now give a combined annual yield of nearly 2,000,000 tons; the department of the Gard being, in fact, the third in importance of the French coal fields. The basin of Aubin, in Aveyron, and the mining district of Le Maine, have in the course of a few years, sprung up into renown.

The production of coal in France, since 1787, has been as below.—tons of 2,200 lbs.

1787..	211,160	1852..	4,816,306
1802..	829,105	1857..	7,755,987
1811..	759,878	1862..	10,102,116
1816..	924,823	1867..	12,148,223
1821..	1,114,448	1868..	13,253,876
1826..	1,513,482	1869..	13,708,662
1831..	1,728,950	1870..	6,550,000
1836..	2,789,858	1871..	No report.
1841..	3,349,303	1872..	15,000,000
1846..	4,389,532		

It is stated that one million tons of hard Anthracite, and the same quantity of soft Anthracite are annually produced in France, the balance being Bituminous coal.

## BELGIAN COAL TRADE.

The Production and Exportation of Coal since 1836, may be observed from the following table:

	Production. Tons.	Exportation. Tons.
1836.....	3,056,464	773,612
1846.....	5,037,403	1,355,833
1856.....	8,212,419	2,866,137
1866.....	12,774,662	3,977,702
1868.....	12,298,589	3,764,502
1869.....	12,926,894	3,592,790
1870.....	13,697,118	3,182,150
1871.....	13,735,175	3,186,204

The wages paid, the number of men employed, and the amount of coal yearly produced, per man, may be seen from the following tables:

Year.	No. of Workmen.	Average Daily Wages.	Tons per man yearly.
		s. d.	
1852....	51,873	1 5	131
1857....	72,557	1 11	115
1862....	80,302	1 11	123
1867....	93,339	2 5	137
1868....	89,382	2 3	136
1869....	89,928	2 3	143
1870....	91,993	2 5	148
1871....	94,286	2 5	145

The little kingdom of Belgium, which until a little more than forty years ago had no place upon the map of Europe, owes all its prosperity and importance to coal and iron. The coal basin lying between Liege and Mons, and including Namur and Charleroi, comprises an area in course of development of 300,000 acres. The feature of the Belgian coal-field is the large comparative extent of the workable surface, owing to the singular contortions of the seams, which are remarkable for their number. The qualities of Belgian coal are very varied; the most noticeable being the *Fleuve* seam, which is unlike any found in England, with the exception of one measure in the Swansea district. For gas making and furnace purposes this coal is peculiarly adapted; but the disagreeable odor it emits during combustion precludes its general use for household purposes. The other leading classes of coal won in Belgium are distinguished as *dures* (hard), *grasses* (fat or coking), and *maigres* (dry, and burning with a small flame).

## IMPORTS AND EXPORTS OF COAL.

Through the courtesy of Edward Young, Chief of the Bureau of Statistics, at Washington, we present the following statement of Imports, Exports and Re-exports of Coal, during the *fiscal year ending June 30, 1873.*

	Tons.	Value.
IMPORTED—		
Bituminous.....	456,015	\$1,589,6
DOMESTIC EXPORTS—		
Bituminous.....	242,453	1,036,2
Other (Anthracite).....	342,180	1,827,8
	584,633	2,914,0

RE-EXPORTS..... 3

For the previous years, 1870, 1871 and 1872, we find the following records:

	Tons.	Value.
Imports, 1870.....	420,638	1,110,3
" 1871.....	443,955	1,132,7
" 1872.....	490,631	1,291,2
EXPORTS, 1870.....	227,918	1,306,3
" 1871.....	277,951	1,369,2
" 1872.....	401,078	1,963,9

The exports of coal from the United States during the year, ending June 30th, 1873, were as below:

Countries.	Bituminous.	Anthracite.
Argentina Republic.....		44
Belgium.....		1
Brazil.....	1,735	98
Central American States.....	2	
Chili.....		846
China.....		2,866
Danish West Indies.....	18,511	7,613
France.....		25
French West Indies.....	13,757	
Miquelon, Langley, and St. Pierre Islands.....		60
Germany.....		2
England.....		102
Nova Scotia and New Brunswick.....	1,911	22,523
Quebec, Ontario, &c.....	163,379	240,199
New Foundland, &c.....		383
British West Indies.....	2,443	3,076
British Guiana.....	744	
British East Indies.....		1,400
Hong Kong.....		1,667
Hayti.....	173	
Japan.....		624
Mexico.....	2,399	5,337
Dutch West Indies.....	701	80
Dutch East Indies.....		83
Peru.....		2,086
Portugal.....		954
San Domingo.....		487
Sandwich Islands.....		1,046
Cuba.....	30,301	24,217
Porto Rico.....	32	89
United States of Columbia.....	6,363	26,006
Venezuela.....		265

Total. .... 242,453 342,180



## NOVA SCOTIA COAL TRADE.

Reports of the coal mined and shipped from Nova Scotia, furnished by the Royal Commissioners:

1827 to 1830.....	51,172 tons.
1831 to 1840.....	808,145 "
1841 to 1850.....	1,405,385 "
1851 to 1860.....	2,292,305 "
1861 to 1870.....	5,092,587 "
Total to 1870 was.....	9,649,470 "
For the year 1870.....	625,769 "
For the year 1871.....	673,242 "
For the year 1872.....	880,950 "

The reports for 1873 will not arrive for several months. The production will probably be nearly one million tons.

The average number of persons employed was 721 men, 331 boys, in the mine; 1,312 men, 153 boys, on the surface. The number of horses employed was 356. The colliery consumption was 0,341 tons for the year 1872.

## PRODUCTION OF THE MINES, IN DETAIL:

Mine.	County.	Tons raised.
Agassiz,	Cumberland.	12,983
Wason,	"	123
Spring Hill,	"	1,450
St. John's,	"	1,194
St. John's,	Pictou.	128,846
St. John's Mines,	"	120,500
St. John's Colonial,	"	115,914
St. John's,	"	140
St. John's Co.,	"	288
St. John's,	"	57,028
St. John's House, Cape Breton	"	46,841
St. John's,	"	52,260
St. John's,	"	3,135
St. John's,	"	495
St. John's Bay,	"	33,133
St. John's,	"	103
St. John's,	"	48,100
St. John's,	"	33,755
St. John's,	"	21,871
St. John's,	"	39,507
St. John's,	"	3,330
St. John's Pond,	"	3,108
St. John's Head,	"	1,084
St. John's Mines,	"	126,341
St. John's,	"	14,253
St. John's Corner, Inverness,	"	5,157
Total quantity raised in 1873 was.....		880,950

## COAL TRADE OF GREAT BRITAIN.

The following Tables give the amount of Coal mined and exported.

	Mined.	Exported.
1854.....	64,600,000	4,300,000
1855.....	61,400,000	4,900,000
1856.....	66,600,000	5,800,000
1857.....	65,300,000	6,600,000
1858.....	65,000,000	6,500,000
1859.....	71,900,000	7,000,000
1860.....	83,200,000	7,400,000
1861.....	85,600,000	7,200,000
1862.....	86,600,000	7,600,000
1863.....	88,200,000	7,500,000
1864.....	92,787,873	8,809,908
1865.....	98,150,587	9,170,477
1866.....	101,630,544	9,053,721
1867.....	104,500,480	10,415,787
1868.....	103,141,157	10,837,804
1869.....	107,427,557	10,588,425
1870.....	112,875,725	11,491,002
1871.....	117,352,028	12,851,957
1872.....	123,386,758	13,211,961

## COAL IN PRUSSIA.

The coal measures are said to be 20,000 feet thick, containing 117 seams, in all 294 feet of coal; of workable seams there are 77 seams with 260 feet of coal in a region 60 miles long by 20 miles wide. Some of the seams are ten, twelve, and fourteen feet in thickness. The lowest seams are Bituminous or coking coals, and the higher they range in the series the more dry or Anthracite do they become.

The production of Coal and Brown coal has been as follows:

1837.....	1,950,915	1864.....	19,408,982
1857.....	9,841,220	1865.....	21,794,705
1858.....	10,721,323	1866.....	21,629,746
1860.....	12,347,828	1867.....	23,738,327
1861.....	14,133,048	1868.....	25,704,758
1862.....	15,576,278	1869.....	26,774,368
1863.....	16,906,707	1870.....	23,316,238

It is estimated that fully one third of the product of Prussia, is what is known as "Brown Coal."



## COAL IN OHIO.

The coal measures within this State occupy a space of about 180 miles in length by 80 in breadth at the widest part, with an area of about 10,000 square miles, extending along the Ohio River from Trumbull County, on the north, to near the mouth of the Scioto, on the south. The regularity in the dip and the moderate inclination afford facilities to the miner not known to those of most other countries.

The counties wholly underlain with coal are Mahoning, Columbiana, Stark, Holmes, Tuscarawas, Carroll, Jefferson, Harrison, Belmont, Guernsey, Coshocton, Muskingum, Perry, Noble, Morgan, Monroe, Washington, Athens, Mies, Gallia, Lawrence, and nearly all of Jackson. The counties of which the eastern or southeastern parts only are underlain with coal are Trumbull, Summit, Medina, Wayne, Licking, Fairfield, Hocking, Vinton, and Scioto. There are small detached basins in Wayne, Ashland, Richland, and Knox Counties. The boundary on the east is the State line, the same field extending eastward over all Western Pennsylvania.

Prof. J. S. Newberry divides the coals of Ohio into three classes: First, the dry, open-burning or furnace coals; second, cementing or coking coals; third, cannel coals. The first, which is popularly known as Block coal, includes those that do not coke and adhere in the furnace, and are such as may be used in the raw state for the manufacture of iron. The second, embracing by far the greater portion, are of the ordinary coking, Bituminous kinds, which to a greater or less degree melt and agglutinate by heat. The third variety consists of the Cannel Coals, which resembles a dark shale, highly impregnated with bitumen, and burns with a bright flame, but does not agglutinate.

The Commissioner of Statistics gives the following tonnages, but expresses the opinion that they are far below the correct figures:

1863.....	1,075,519	1867.....	1,868,155
1864.....	1,621,091	1868.....	2,210,575
1865.....	1,371,614	1869.....	2,198,202
1866.....	1,685,200	1870.....	2,527,285

The coal field of Ohio is second in import-

ance only to that of Pennsylvania. Its coal beds are numerous, of good size, near the surface, easily traced. Mines can be opened with little expense, and the mining requires but little labor.

The chemical analysis of the Ohio coals show that the relative amount of moisture varies from 1.10 per cent to 9.10 per cent. The amount of volatile matter varies from 28 per cent to something over 40 per cent. Fixed carbon varied from 34.10 (in the upper coal from Holmes County) to 65.90 (in the coal from the Steubenville shaft). The ash found in 11 Ohio cannel coals was 12.827 per cent. The average proportion of sulphur was 1.551 per cent, that from the lower half of the State being 1.229 per cent, and that of the coal from the upper half 1.836 per cent.

The figures given above are mainly derived from the able reports of Prof. J. S. Newberry, the State Geologist. In a State so well provided with railway facilities it is impossible to attempt to give the outlets of the various coal fields to markets. Suffice to say that the State has limited the charges on coal over the railways to one and a half cents per ton per mile. In addition the noble river Ohio furnishes abundant and cheap means of transportation for coal and the other mineral products of this great State. The principal point at which the coal from this State is received on Lake Erie is Cleveland, and the reader is referred to a particular article descriptive of the business at this place, to be found further on.

## COAL TRADE ON LAKE ERIE.

The first time that Bituminous coal appeared as an article of commerce on the Lake was in the year 1829, when the northern division of the Ohio canal was opened from Akron, O., on the edge of the Ohio coal field. Up to 1854 it was brought by this means to Cleveland. In that year the Cleveland & Pittsburgh and the Cleveland & Mahoning roads penetrated the coal fields, and gave another outlet. The Bituminous coal from Mercer County, Penna., is received and shipped at Erie, Pa. These two ports transact about all the Bituminous coal business of Pennsylvania & Ohio on the lakes.

## ANALYSIS OF THE COALS OF INDIANA. BY DR. E. T. COX.

	Specific Gravity.	Weight of cubic Foot	Coke.	Volatile Matter.	Ash.	Fixed Carbon.	Water.	Gas.
<b>CLAY COUNTY.</b>			lbs.					
Star Mine, Planet F'n'ce, Block coal I.	1.264	79.0	64.0	36.0	2.5	61.5	3.5	32.5
Knightsville, T.H. & I. R. R.....	1.176	73.5	60.1	39.9	0.3	59.8	9.0	30.9
" " ".....	1.167	72.9	59.0	41.0	2.0	57.0	8.0	33.0
Garlick & Collins Brazil.....	1.23	76.9	60.5	39.5	3.0	57.5	8.5	31.0
North of Brazil, Mc Clelland.....	1.28	79.9	56.2	43.8	1.5	54.7	5.0	38.8
Barnet's south of Brazil.....	1.25	78.1	58.2	41.5	1.5	57.0	4.0	37.5
Stanton coal L, 7 feet.....	1.32	83.0	53.3	46.7	6.0	47.3	7.0	39.7
<b>GREENE COUNTY.</b>								
Mc Cissick's Coal A, 3 feet.....	1.19	74.3	64.5	35.5	2.0	62.5	3.5	32.0
Babbitt's Coal A, 2 feet.....	1.24	77.3	61.4	38.6	1.5	59.9	3.0	35.6
Bledsoe's Coal L.....	1.25	78.2	63.5	36.5	0.5	63.0	7.0	29.5
<b>PARK COUNTY.</b>								
Buchanan, I, 4 feet.....	1.23	77.0	64.5	35.5	2.0	62.5	4.5	31.0
Batty's Coal K.....	1.23	77.0	58.5	41.6	2.5	56.0	3.0	38.5
<b>FOUNTAIN COUNTY.</b>								
Thomas's Coal K.....	1.28	77.0	64.3	35.7	6.5	59.8	5.0	32.7
<b>VERMILLION COUNTY.</b>								
Mill Bank, L.....	1.29	80.5	52.2	47.8	4.5	47.7	3.5	44.3

## INDIANA.

The area of the Indiana coal measures approximate one-fifth of the entire State, and embraces the counties of Perry, Spencer, Warwick, Posey, Vanderburg, Gibson, Pike, Dubois, Davies, Knox, Martin, Sullivan, Greene, Clay, Vigo, Parke, Vermilion, and Fountain. The most important coals from a manufacturing point of view, are those known as the "lower block" 3.8 thick, the "main block" 4.4 thick, and "upper block" 1.10 thick. Block coal has a laminated structure, splits readily into sheets, and breaking with difficulty in the opposite direction; on burning, scarcely swells, or changes form, and never lumps or runs together. Dr. E. T. Cox, the eminent state geologist gives this coal an exceptional character as an iron smelting fuel, and reports a ton of pig iron as being made with two tons of block coal. From careful assays it is ascertained that this coal gives from 56 to 62 per cent. of fixed carbon, a small amount of water and a small amount of Ash. What the celebrated English chemist, Mushet, said about a certain Welsh coal, is equally applicable to the block

coal of Indiana. "To the purity of splint coal it unites all the softness and combustibility of wood, and the effects produced by it in the blast-furnace, either as to the quality or quantity of iron, far exceed everything in the manufacture of that metal with charcoal.

The "upper block" at Washington, in Davie's county is extensively mined and meets with a ready market at St. Louis and all the towns on Ohio and Mississippi Railroad, its specific gravity is 1.294; a cubic foot weighs 80.87 lbs.; by analysis it yields: fixed carbon, 60.00, ash, 4.50, vol matter, 35.50: The percentage of coke in Indiana coking coals, ranges from 52.00 to 64.50, and the ash from .50 to 7.00 per cent.

The census report for 1870, shows the product for the former year to be 437.870 tons, of which 236.642 from Clay County, and 64.33 from Davies.

## WEST VIRGINIA.

The coal measures of West Virginia cover nearly 16,000 square miles. In the New River and Kanawha valleys the coal beds make their appearance to the number of 14, with an aggre-

gate thickness, at places of 100 feet, of which more than half is in workable beds of from 3 to 8 feet in thickness. By the erosion of the streams, the coal seams crop out on the hill sides high above the water and railroad levels, in the most favorable position for easy, cheap and safe excavation. The cost of opening mines is small, and the ventilation and drainage are natural, and the cost of bringing coal to the surface must always be cheap as in any other coal field.

The principal varieties are the bituminous, the splint, and cannel. Of the bituminous, there are seams of different degrees of hardness and texture, from the friable or "fatty" coking coal, similar to the best of the Newcastle (England) coals, to the harder "block" coals with regular cleavage, similar to the Youghiogheny coals so largely in demand in the Western and Southern cities.

The splint coal of the Kanawha is a hard, close-grained, dry burning variety, peculiar to this region, and is usually found here in conjunction with the seams of bituminous or cannel. Its distinctive features are a square, regular cleavage, and great purity, being nearly free from sulphur and earthy matter. It is also found to have great sustaining strength in the furnace-stack, which, together with its great purity, make it valuable for the manufacture of iron, since it can be used to its raw state, without coking.

It makes a black, soft, malleable iron, which ranks in quality and price, with "No. 1 foundry" or the best quality of charcoal iron.

The presence of this valuable coal in such quantities, and in such position that it can be mined very cheaply, is of incalculable importance to Virginia and to the furnaces in Southern Ohio and Kentucky.

The Chesapeake and Ohio Railway Co., is at present the main outlet for the coals above Brownstown, but if the navigation of the Kanawha is improved, there cannot be a doubt but that the millions of tons can be sent westward to the Mississippi or eastward to the Atlantic.

The Chesapeake and Ohio railroad has opened an outlet for the coals of West Virginia from a point within a few miles of the line near Quinimont station, where are some seams of good soft bituminous coals, as far as Charlestown, W. Va.

The main seams occur between Hawk's Nest on New River and Alden on the Kanawha—the former being the most easterly point at which the

fine coals of the middle series of the measure have been attacked. The coals below Alden are better carried by boat than rail.

The coal lies horizontally in many workable seams from three to twelve feet in thickness. can be mined very cheaply and the quantity available is vast beyond conception.

Prof. D. T. Ansted of England, says the Kanawha coals can be got in the cars or boats cheaper than any coal in any part of the world.

This region has already attracted much interest from capitalists at home and abroad, and collieries are being opened, and the region developed, but the railway company at present refuses to carry coal for less than  $1\frac{1}{2}$  cents per ton, per mile, which operates against it somewhat. The distance to Richmond, Va., from Coalburg is 3 miles; from Cannelton 344 miles; and from Hawk's Nest 325 miles.

The Peytona Coal found at Peytona, has been introduced for gas purposes, and the result gives vol matter, 46. Fixed carbon 41. Ash 13.

The railway company charges through Richmond, Va., on coal \$4.50 per ton, and allows a drawback of fifty cents on shipments to the North. Freights from Richmond to New York range from \$2.00 to \$2.50 per ton; and it is calculated that the cannel coal of Virginia can be sold at \$8.50 to \$9.00 per ton, delivered New York City.

## COAL IN KENTUCKY.

BY PROF. R. P. STEVENS.

KENTUCKY is the only State mineralogically endowed with two distinct coal-fields. The one of Illinois enters the State near Hawesville, and occupies nearly the whole of twelve counties in the northwestern portion of our State. The Appalachian coal crosses the Ohio River, a little above Portsmouth, and fills up nearly the whole of the eastern twenty counties. Between the coal fields lie rich mines of iron ore, lead, zinc and petroleum. The interior of the State is blessed with some of the most fruitful fields in the United States. An agricultural and grazing country, capable of sustaining any manufacturing and mining population of the mineral portion.

Prof. D. D. Owen, before his demise, made a mineralogical and geological portion of the State, but the work was not completed. A large portion of the eastern coal-field was unfinished



Since the suspension of the survey new discoveries have been made—new coals opened and brought into market. Some of these new works I propose to make brief mention of.

Approaching the southeastern counties, by the Cumberland Gap branch of the Louisville and Nashville Railroad in the county of Rock Castle, we first encounter the sub-carboniferous limestone, which is the floor of the coal measures of the State. The lime-stone series are here three hundred and fifty feet thick, composed of an underlying sand-stone, some few feet of colored shales, white marble beds, cherty beds, and mineral limestone. Upon this member of the group reposes the coal conglomerate, frequently eighty and ninety feet thick.

Ten miles from Mount Vernon, the county-seat of Rock Castle County, at a station of the railroad named Pine Hill, we first met "coal workings." The coal measures of the three hills where the coal is opened rests immediately upon the limestone without the intervention of the conglomerate; it being in this case quite an anomaly. There are two veins of coals in the hills. The lower one, at an elevation of fifty feet above the railroad, is too impure to be of any commercial value. The upper coal, about fifty feet beneath the summit of the hills, is the one worked by the collieries. The distance from the depot is about a half mile southward. Three different collieries are worked, shipping some twenty to twenty-five carloads a day. The upper coal is three feet thick, and has the usual appearance of a good, dry-burning bituminous coal. It was bought by some iron-masters from Mahoning, Ohio, to be worthy of trial for manufacturing of iron in its raw state.

Four miles further eastward from Pine Hill, at the turnpike from Crab Orchard to Cumberland Gap, the lower coal is worked for local purposes at Mains Bank. The vein is three feet thick, with a parting of clay in the middle. It is a good, free burning coal, and much praised as a grate coal.

One half a mile north from Mains Bank, near the last tunnel, and on the north side of Rough Creek, the upper coal is worked and daily shipments made. Between these two last mentioned coals and Pine Hill lie hills of conglomerate and sandstone, which must, in the days of

these coal formations, have been ridges of sand and gravel hills between them.

At Livingston Station, the terminus of the road, the upper coal is again worked, and a fair business done by the two companies working the mines.

From the collieries east of the tunnel some twenty-five cars of coal are shipped daily to the interior of the State, where the products of the mines find remunerative market. Louisville, 150 miles distant, receives some of its coal from Pine Hill.

Crossing Big Rock Castle River, we find the limestone of Mr. Vernon at the base of the hills extending up some 100 feet. We ascend Wild Cat Mountain to the height of 700 feet above the river, and pass over seven miles of country filled up with sandy shales and thick-bedded sandstones, without seeing any signs of coal.

The flat summit of this mountain is a pinkish sandstone, easily weathering to fine sea-sand, and standing in many places as high walls, castellated walls upon the crest of the mountain.

Descending into the valley of Hazel Patch and down it into the valley of Little Rock Castle River, we soon begin to ascend to an extensive table-land, reaching southward and eastward through Laurel and Knox counties.

Before reaching London, the county-town of Laurel county, we find a vein of coal under sandstone. At London, in the fields and village lots there is a two-foot vein of coal which supplies the town with fuel. It is mined in the low land by simply stripping off a few feet of alluvial clays. There are two feet of good, free burning coal.

Travelling eastward, from London to Manchester, the county-seat of Clay county, 35 miles over a country constantly rising by a series of broken plateaus, composed of thin-bedded sandstones and shales, though sometimes, especially on the east side of the hills, the sandy layers harden up and become massive. We saw no valuable coals.

Descending into the tributaries of Kentucky River, we encounter five different coals:

Ascending Little Goose Creek, we enter upon a new series of coals—seven in all—before reaching the boundary of Harlan county. The distance travelled is twenty-five miles.

On our way down, we notice several veins of coal, which may be the same we passed ascending Little Goose Creek.



## COAL IN ILLINOIS.

The valuable features of the Illinois coal are, that there is plenty of it; that it is very widely distributed over the State, and accessible. For, although it is necessary to mine it by means of shafts in almost all cases, yet the coal is reached at a reasonable depth from the surface; its mining is done without unusual expense; the great number of railroads in all parts of this prairie State, with good level grades, and without curves, furnish an abundance of cheap transportation; and, poor as the coal is, there is a large market for it, for the want of better. In Chicago, a large quantity of Pennsylvania Anthracite is sold, owing to the very cheap transportation from Buffalo by the lakes. A large amount of Erie and Cleveland block-coal is also sold there for grates and steam; also, they have Blossburg coal for blacksmithing, and the best gas-coal from the Pittsburgh region; there being, in fact, a stock of every variety of the best coals produced in the United States for all the various uses.

Nothing is too good for our Western people cost what it may; and then, the poor man's coal is their own Illinois Bituminous, which is brought by rail from the northern limits of their coal-field, about 60 miles south of Chicago, and sold, uncleansed of sulphur and slate, in considerable quantities to those who cannot afford the better qualities of Pennsylvania coal. Large quantities of the Pennsylvania and Ohio coals are shipped from Chicago by rail, in all directions, as far west as Omaha, and far south into the interior of Illinois. In localities too remote to obtain these, their own coal is extensively mined, and used for domestic purposes. More care in mining and cleaning would very much improve the quality of the Illinois coal.

It must be remembered, however, that probably the best coal of Illinois may not yet have been developed. The very valuable iron-smelting, Big Muddy coal of Jackson county, in the southern part of the State, as well as some of a fair quality in other localities, gives us ground for hope of yet finding coal of a better quality than much of that which is now mined. Certainly, a large amount of coal lately developed, in West Indiana, is of a much better quality than the coal of Illinois generally; and as we have no reports as yet of thorough explorations of the

counties in the central and eastern part of the State, in the vicinity of where the valuable seam of coal on the Indiana side have been discovered we have reason to expect an extension of them into the eastern part of Illinois. Whatever there may be of value, Western enterprise will develop. The wide distribution and vast extent of the Illinois coal-field are truly wonderful. Here coal fields are as inexhaustible as the soil of her fertile prairies.

The United States census of 1870 reports the production of coal in Illinois at 2,629,563 tons. To those accustomed to the very large production of Eastern mines near our seaboard, or large cities, these figures may appear small, but it should be considered that this is but the infancy of the coal business in the West. Many of the mines have been opened a very short time; the country is quite new, and thinly settled; some of the localities are far in the interior, remote from large towns, and many of the particulars which have been mentioned in this chapter are given more as indicating what we may expect hereafter, than for their present importance.—  
COAL REGIONS OF AMERICA.

In La Salle county are three seams of coal, the upper  $4\frac{1}{2}$  to 5 feet thick, the middle usually 6 ft., and the lower 4 ft., the most popular in market is the middle, as it makes a dense fire, and is largely used for steam and domestic uses. In 1870, the product was 173,864 tons. (Census reports).

What is known as Wilmington coal, is found in Will, and Livingston counties, in a seam averaging 3 ft. in thickness; large quantities are mined as the last census report shows 228,000 tons from Will county. It makes a good steam-coal and is much liked for locomotive use.

St. Louis, Mo., obtains a large supply of bituminous coal from the Belleville district, in St. Clair county, Illinois. This county contains 450 square miles of coal, and the last census returns show a production in this county of 793,810 tons.

The principal seam worked is five to seven ft. in thickness, and is economically worked. Analysis of this coal shows, Water 6. vol. matter 33.8, fixed carbon 55.2, ash 5.

Prof. Worthen says: "This coal compares favorably with the average bituminous coals of this or adjoining states.

Danville and Catlin, in Vermillion county, produced 115,640 tons in 1870. The seam is six feet thick, furnishing a good fat, soft caking coal.

## THE COAL TRADE OF ST. LOUIS.

Extending for a distance of from 100 to 200 miles on opposite sides of the Mississippi river, are two of the most important and remarkable mineral deposits in this country.

On the east bank of the river, reaching nearly across the state, lie the celebrated coal fields of Southern and Central Illinois, the magnitude of which renders the supply practically inexhaustible for all time to come. On the west bank of the river, and underlying the State of Missouri, south of the Missouri River, are deposits of iron, lead, copper, zinc, tin, nickel and other minerals the extent of which are only equalled by the fuel supply opposite. St. Louis, the central point between these fields, has always been the principal market for Illinois coal, and with the development of the mineral resources of Missouri, is now assuming considerable importance as a manufacturing point, ranking as the third city in the Union.

There are many valuable deposits of coal in Missouri, but they are too far distant for a regular supply, while the mines near St. Louis produce an inferior quality for manufacturing purposes. The mines of Southern Illinois are near the city and river, the quality is good, the supply endless in quantity, and the coal easily and cheaply mined.

The following table shows the amount of coal shipped to East Louis over the various railroad, during the year ending June 30th, 1873.

Railroads.	Bushels.	Tons.	Cars per day.
St. Louis and North Line.....	8,779,275	351,171	117
St. Louis and Mississippi.....	6,106,000	244,000	82
St. Louis and Illinois and St. Louis, (Pittsburg).....	2,784,765	151,391	51
St. Louis and Southern.....	2,835,000	113,400	38
St. Louis Vandalia and Terre Haute.....	2,612,700	104,508	25
St. Louis, Wabash and Western.....	450,000	18,000	6
St. Louis and St. Louis.....	270,000	10,800	3
Total,	25,369,050	1,014,763	239

Some distance below St. Louis are the Biguddy coal fields; the principal outlet being the Grand Tower, Ill's. The quality of this coal is superior for smelting purposes; resembling the block coal of Indiana, and is principally con-

sumed by the furnaces at South St. Louis, where it is brought in barges. Its use is generally in connection with coke. The amount consumed during 1873 may be estimated as follows:

<i>Big Muddy received at South St. Louis in barges,</i>		
Nine Blast Furnaces ( $\frac{3}{4}$ time)	300 tons per day.	
Three Zinc Works,	20 " "	
Total,	320 " "	

This amount does not include shipments received by the St. Louis Gas Company and the South St. Louis furnaces, by barges from Grand Tower and other points.

The receipts for the quarter ending, Sept. 30th, 1873, were:

	Cars.	Bushels.
July.....	8,142	2,270,282
August.....	8,076	2,372,455
September.....	9,058	2,502,331
Total,	25,275	7,145,070

Since last spring many new mines have been opened, which, with the pits now being sunk, are included in the following exhibit, showing the actual number of mines in operation, the new mines opened as well as those in contemplation and not included in the above table.

## ON THE ST. LOUIS AND SOUTH-EASTERN RAILROAD.

The following are the old pits on the St. Louis and Southeastern railway: East Belleville Mining company, Enterprise mine, Berkner's mine, Welsh Mining company, Dutch Hollow mines, Knecht's mines, and Turkey Hill mine.

The new mines are; Ebner & Thomas mine, Meyer's mine, I. X. L. mines, Humboldt mines, and Wetzlau mines.

## ON THE ST. LOUIS, VANDALIA AND TERRE HAUTE RAILROAD.

The Abbey Coal Mining company have two pits; Bartlett Coal company, two pits. The Collinsville Coal company are sinking a new shaft, viz. The Lumaghi mines.

## ON THE CAIRO SHORT LINE.

Enterprise mine, Du Quoin; this mine, as well as Wall's colliery, on the Illinois Central, ships about 10 cars of slack and blacksmith coal daily to East St. Louis. The balance of the coal is shipped to Northern Illinois.

Beauconp mines employ 150 men. Barthell's mine, Freeburg. Klein's mine. Freeburg. Stol-

berg's mine, Belleville. German Mining company, Belleville. This company is working on the co-operative system and furnishes the Belleville rail mill with coal. They work about 50 men. Holaban & Slain, Belleville. Sam Swancutt's Belleville. Brandeuberg's, two pits, Hazard, Wilson & Co., Belleville. Pointon's, Winona mining company. Wm. Skillett & Co., Mellor, Yock and Bros., Albion mines, Palme & Co, Gartside No. 3, Gartside No. 2, Gartside No. 1. Workingmen's mining company.

The above comprise the old mines on this road. The following new mines have been and are now being opened: Denney's mine, Pickneysville, Jones's mines, Pinckneyville, Gordon & Thompson, near Pinckneyville, Holliday's, Coulterville, Anna mines, New Athens, Lemen's mines, Heinrich's & Co.

There are shipped over this road about 7 cars of Big Muddy coal every day for the Vulcan Iron works, which are barged across the river from Carondelet. The same cars, reloaded with iron ore, are taken back by the same route to Grand Tower.

#### ON THE OHIO AND MISSISSIPPI RAILROAD.

Trenton mines, Nichol's mine, Lebanon, Bartlett coal company, O'Fallon, two pits, Alma mines, O'Fallon's, two pits, Devil's Hole, worked by the Abbey coal mining company, Smith & Wonderly, E. Schrader's mines.

#### ON THE ILLINOIS AND ST. LOUIS RAILROAD.

Pittsburgh mines, Jos. Yock & Bro. Western mining company, Belleville, Hazard, Wilson & Co., John Kloe's, Sam. Swancutt.

The following new mines have been opened on this road: Bluff mines, Brier Hill, Johnson's, Harmony mines, Beard & Beatty, Schurman & Bros.

Besides the above, four new pits are being opened in West Belleville, which, when in full operation, will employ over a hundred men and ship about thirty cars of coal every day.

The Toledo, Wabash and Western, and the Indianapolis and St. Louis railroads bring to East. St. Louis ten or fifteen cars of coal every day, but no new mines have been opened on those lines that we are aware of.

The following statement affords a tolerably correct idea of what the shipments on the railroads named:

Names of Railroads.	Cars.	Men.	Bush.
St. Louis and Southeastern....	53	204	15,950
St. Louis, Vandalia and Terre Haute.....	67	360	20,100
St. Louis and Cairo Short Line	207	874	62,100
Ohio and Mississippi.....	91	365	27,300
Illinois and St. Louis.....	115	410	34,500
Toledo, Wabash and Western	10	40	3,000
Indianapolis and St. Louis....	5	20	1,500
	548	2,273	164,400

It will appear from the above that the daily average shipment will be 164,400 bushels or over 40,000,000 bushels per annum, being an increase of sixty per cent. over the past year.

The transportation across the river is the most serious obstacle which operators have to contend with.

Before the strike last year coal was selling in the yards at East St. Louis for 7 cents per bushel, or \$1.75 per ton; it is now bringing 9 cents per bushel, or \$2.25 per ton, and retailing at 13 cents. This increase is attributable to the additional expenses entailed on the operators during the past year, among which are: First, the extra one-half cent on every bushel paid to the miner. Second, one-half increase per bushel to the railroad companies for transportation. And third, the expense of sinking additional air shafts in each mine as required by the law of Illinois.

Previous to the strike in August, 1872, there was no fixed rate established for digging coal, and operators were permitted to make their own contracts with the men. The prices paid ranged from 2½ to 3½ cents per bushel, but during the suspension a uniform rate of four cents was established by the Miners' Union in St. Clair county and acquiesced in by the operators. This agreement expired by limitation in September last.

The cost of transportation in 1872 was two cents, but the price has been advanced by the railroads since June to two and a half cents, and there is no prospect of any diminution of this tariff for some time to come.

The area of the coal beds of Missouri is stated to be 26,887 sq. miles. The production, by the census returns for 1870, amounted to 621,930 tons, of which some 444,642 was from St. Louis county.



## BRAZIL, INDIANA.

The coal in this district is favorably known as an iron-smelting fuel, and a descriptive article of its quality, etc., is not out of place. For the main points, we are indebted to J. J. Ehrack, Secretary of the Clay County Coal Association.

There are two veins of coal; the upper vein, averaging about three feet ten inches in thickness, and the lower one, averaging about four feet. The roof is principally sand rock, slate, and sand slate and sand rock mixed. Fire and potter's clay of good quality underlie the coal. The average depth to the first vein is about forty-five feet from the surface, and the second lower vein is found about thirty feet under the first, or at an average depth of seventy-five to eighty feet. The coal is free from slate and sulphur, and can not be surpassed for furnace purposes, and is excellent for steam and domestic purposes. It burns freely and leaves a soft, white ash, similar to wood ash, and no clinkers. It has been decided to use it in the public schools of Chicago and Indianapolis, on account of its purity and freedom from sulfur. For domestic and steam purposes this coal is largely used in Chicago, Illinois; Indianapolis, Indiana; Kalamazoo, Michigan; and the towns and stations along the lines of most of the railroads named below. Pig iron made from this coal is particularly adapted to the manufacture of Bessemer steel. This coal field is being developed very rapidly, but we yet lack capital to erect more mills and blast furnaces, as well as other manufacturing establishments, which will insure a large and steady home consumption. A donation of fifteen acres of land has been made to the city for the purpose of a reservoir for water, which will speedily be constructed with a view of inducing manufacturers to locate their establishments here, where they will have the advantage of close proximity to the coal. The price now paid for mining is one dollar per ton. Coal is worth on cars one dollar and fifty cents per ton, but they go up to \$3.00. There are many farms here which are underlaid with coal yet untouched, awaiting the capital necessary to open their mines to the light.

There are supplied with fuel (block coal)

from this district, iron manufacturing establishments located as follows: Four blast furnaces and one muck mill in this immediate neighborhood; two blast furnaces and one nail mill at Terre Haute; one nail mill at Greencastle; two rolling mills at Indianapolis; two blast furnaces, two rolling mills and one Bessemer steel works at Chicago; one Bessemer steel works at Joliet, Illinois; one rolling mill at Decatur, Illinois, and one rolling mill in Evansville, Indiana. The following railroads get all or a portion of their supply of fuel from this district: The St. Louis, Vandalia, Terre Haute and Indianapolis Railroad; the Jeffersonville, Madison and Indianapolis Railroad; the Indianapolis and St. Louis Railroad; the Louisville, New Albany and Chicago Railroad; the Cincinnati, Lafayette and Chicago Railroad; the Lake Shore and Michigan Southern Railroad; the Michigan Central Railroad, and the Tug Association of Chicago. Coal has also been shipped from this place to the blast furnaces of St. Louis, and in time of low water in the Ohio River to Cincinnati and Louisville.

Mr. Peter Erlish, one of the most extensive miners in this region, says: "In 1868, when he commenced mining, and from that to 1861, five men did all the block coal mining. Now there are 45 mines opened, and last Winter, 1,800 men found employment in them. About seven eighths of these mines produce block coal; the remainder simply bituminous. The latter brings but \$1.75 per ton at the mines, while block coal sells for half a dollar more, or \$2.25 per ton. Most of the mines are worked by lessees, who pay a royalty of 20 to 32 c. per ton to the lessor; Mr. Erlish, who works 45 to 65 men and mines 12 tons to a car, pays but 21c. per ton royalty, and \$1 per ton for mining, leaving him 54c. per ton clear. A majority of these mines have been opened during the past year. They will average, when worked to their full capacity, 200 tons per day, each, many of them yielding more than this.

## PRICES OF BROAD TOP COAL.

Unfortunately, it is impossible to give an exact average price for this coal, f. o. b. at Philadelphia. None of the dealers having taken the pains to make the necessary figures and forward them, we make the following, which are approximately correct.

1863.....	\$5.25	1869.....	\$4.75
1864.....	6.50	1870.....	4.50
1865.....	7.25	1871.....	4.60
1866.....	5.75	1872.....	4.70
1867.....	4.75	1873.....	5.00
1868.....	4.60		

## STRAITSVILLE, OHIO.

A description of this region will be found interesting.

Scientific analysis and practical tests have established the following facts relative to this coal and its properties:

1st. That its gas product from a stated quantity is equal in volume to that generated from a like quantity of the best known gas coals, while its excess of illuminating power is fully twenty per cent., and the quality of its coke is unsurpassed.

2d. That owing to the unusual percentage of fixed carbon entering into its composition, it outranks any and all American coals as a generator of heat or steam.

3d. That in the blast furnace or the rolling mill, the quantity of coal required to produce a ton or any stated quantity of iron, is less than that of any other coal now in use by American manufacturers, and that it is equally well adapted to the welding of iron or steel.

The comparative facility with which this coal can be produced, and the advantages in the way of cheap transportation, which are now afforded, enables it to be furnished to consumers at prices which will compare favorably with those of any other coal of recognized value.

J. S. Newberry, Chief Geologist for the State of Ohio, states that: "these coals are all rich in carbon, with generally, very light ash and little sulphur."

He states further that these coals, are well fitted for iron making and for gas of high illuminating power, and destined to play a very important part in the future history of central and southern Ohio. No one knows better than an intelligent geologist how very rare is a first-class Bituminous coal, one adapted to the higher purposes of iron and gas making. The discovery of such a coal is no small addition to the wealth of a state. Much credit is due to Professor Wormley for the exceedingly thorough and scientific chemical analysis of our coals. The fact which he has entirely demonstrated, that the sulphur in many of our best coals, is not chiefly combined with iron but with the volatile portion of the coal, and consequently passes off in coking, is one of the highest im-

portance, and may be regarded as one of the most valuable contributions ever made by chemistry to economical geology. The bearing of this fact upon the metallurgy of iron is apparent.

The analysis by Professor Wormley of four samples of this coal viz.: the lower, middle lower part of upper, and upper part of upper layer, gives us the result in each instance 59.00, 60.45, 57.55, and 55.75 of fixed carbon.

The heating powers of these coals are given by Mr. T. C. Mendenhall, as follows:

Calorific power or No. of lbs. water raised 1 degree (centigrade) by 1 lb. of coal.....	No. 1. 65.89	No. 2. 67.9
Calorific intensity in degrees of Fahrenheit.....	46.27	46.6
No. lbs. water evaporated from 212° by 1 lb. of coal.....	12.27	12.6
Cubic feet of air required for combustion of 1 lb. of coal}	121.00	125.0
Calorific power compared with pure charcoal.....	81.5	84.1
Calorific intensity compared with pure charcoal.....	94.1	94.6

Professor Newberry further says:

"The coal from Straitsville was found to contain, as the average four samples representing the whole seam, .079 per cent, of sulphur.

When reduced to coke it was found that 0.657 per cent had passed away in the gases leaving only 0.134 per cent. in the coke. The percentage of the coke represented by the residual sulphur is 0.173." The illuminating power of the gas, according to the photometric tests of Professor Wormley, the State Inspector of gas, averages from 17 to 19 sperm candles, with an average of 18 candles. The power of the gas from the Youghiogheny coal the standard gas coal of the Western States, is by the same tests from 13 to 15 candles. Mr. Doty, the Superintendent of the Columbus Gas Works, states that by his photometer he also finds the illuminating power of the Straitsville gas to be, on an average, 18 candles, while the average of that of the Youghiogheny coal is but 14 candles. The great advantage in brilliancy, added to the comparative cheapness of the coal, will more than counterbalance the other defects of the coal as gas coal."



	Queen C. Island.	Sitka.	Seattle.	Rocky Mountains.	Saghalien.	Fuca Suralis.	Mount Diablo.	Coca Bay.	Bellingham Bay.	Vancouver's Island.	Chil.	Sydney, Australia.	English.	Cumberland.	Anthracite.	Total.
1860....	...	...	...	...	...	...	6,020	8,145	5,400	6,655	1,900	7,850	6,640	5,970	39,985	77,685
1861....	...	...	...	...	...	...	6,240	4,630	10,955	6,475	12,495	28,370	23,565	2,975	26,000	116,245
1862....	...	...	...	...	...	...	43,200	2,115	10,950	8,870	5,110	12,590	23,065	4,970	36,650	120,645
1863....	...	...	...	...	...	...	50,700	1,180	7,750	5,745	1,790	16,800	14,000	6,070	38,600	135,560
1864....	...	...	...	...	...	...	60,530	1,900	11,845	12,785	2,225	21,100	18,330	7,275	41,680	167,298
1865....	...	...	...	...	...	...	60,530	1,500	14,445	13,181	1,410	16,800	18,330	4,230	22,555	150,147
1866....	...	...	...	...	...	...	60,530	2,125	11,380	10,852	1,450	16,800	18,330	4,230	22,555	150,147
1867....	...	...	...	...	...	...	103,489	8,415	8,850	14,852	14,840	31,511	29,761	12,177	29,502	243,025
1868....	...	...	...	...	...	...	124,857	10,524	13,806	23,348	14,850	31,511	29,761	12,177	29,502	243,025
1869....	...	...	...	...	...	...	138,752	14,824	13,855	14,850	1,114	73,115	17,346	11,535	21,844	298,973
1870....	...	...	...	...	...	...	138,752	20,367	13,855	12,640	7,350	88,952	17,346	11,535	21,844	298,973
1871....	...	...	...	...	...	...	138,752	28,500	20,284	13,621	4,161	88,942	17,346	11,535	21,844	298,973
1872....	...	...	...	...	...	...	177,282	82,562	4,100	26,003	3,682	115,332	54,191	6,060	7,291	315,194
1873....	...	...	...	...	...	...	177,282	82,562	4,100	26,003	3,682	115,332	54,191	6,060	7,291	315,194
1874....	...	...	...	...	...	...	177,282	82,562	4,100	26,003	3,682	115,332	54,191	6,060	7,291	315,194





## COAL ON THE PACIFIC.

The first production of coal on this coast was in 1852, at Newport, on Coos Bay. The owners of the mine at one time owned and ran the old propeller Hartford, between that place and San Francisco; but as the steamer could burn a good deal of coal and carry very little of it, the venture was for a time abandoned as unprofitable. Since then the work has been resumed and the coal carried by sailing vessels. The Eastport mines, on the same bay, were opened much later.

In some of the mines about Monte Diablo, the shafts fill up so fast that the proportion of water removed to that of coal is nearly two tons to one. This, of course, cuts off a great share of profit.

The Monte Diablo mines were first discovered in the year 1859, but for a long time the coal was decried as worse than useless. But it could not long remain out of use at \$7 a ton while Eastern coals were bringing from \$18 to \$22. The principal mines in the Monte Diablo region are the Cumberland and Black Diamond, owned by the Bank of California, and the Union, owned by S. B. Whipple & Co.

The mines at Bellingham Bay were opened in 1857, just before the outbreak of the Fraser River hegira. These mines are located near Sehome, and belong to the Bank of California.

On Vancouver's Island, in the British possessions, is the best grade of coal found, the mine being located at the village of Nanaimo, about sixty miles northeast of Victoria. The coal from this mine is preferred for steam purposes to all others found on this coast, for the reason that it makes no clinker, has but little sulphur, and does not burn too rapidly, like the Seattle coal.

The mines on Lake Washington, near Seattle, King County, Washington Territory, have been worked nearly four years, and will eventually become good property, as the quality of coal produced is excellent, save for steam. The objection against it is that it burns too freely and makes too hot a fire.

The Seattle mines are very expensive to work, as they have a lake to cross with their cars on ferry boats before they can put the cars on the

railroad track. Coal has been discovered near Point Elliot, eighteen miles north of Seattle and the newly-found deposit is said to be fully equal to that of Lake Washington mine.

Going further north, we find a discovery of Anthracite coal, on Queen Charlotte's Island, but the lead was too narrow to pay expenses.

More recently we learn of the Sibrian Coal Company, operating at a point seventeen miles north-east of Oakland, and the cheering prospect is presented of having a valuable coal-field opened much nearer San Francisco than any heretofore worked on an extensive scale. That this almost precious fossil exists at that locality in considerable quantity is abundantly shown by the developments already made, three compact veins from one to three feet in thickness having been laid open at a depth of only thirty feet. The coal is of the Bituminous variety solid and bright, and burns with great freedom creating less smoke and leaving a smaller amount of residuum than that from the Monte Diablo mine.

We give below a four year comparative statement, which will indicate at a glance the increased consumption of the several varieties, at San Francisco, Cal. :

	1869.	1870.	1871.	1872.
Foreign...	109,000	135,168	113,483	174,21
Eastern...	38,600	30,820	13,291	29,66
Domestic...	184,100	167,183	188,420	230,58
Total.	331,700	333,171	315,194	434,46

For these facts and figures we are indebted to the COMMERCIAL HERALD.

## COAL AS FUEL.

As fuel, coal had long been used; the Chinese forerunners in most discoveries, knew its value centuries ago; in their own country the Romans are known to have used it, and from the 12th century to the present day there has been an ever increasing trade in that most important of minerals. As long ago as in Edward the Sixth's reign, 1552, coal was sent to France and a letter of that date speaks of "that thing that France can live no more without, than the fische without water; that is to say, Newcastle coles; which without that they can neither make steel worke, nor metall worke, no wyre worke nor goldsmythe worke, nor gonnies, nor no manner of thinge that passeth the fier."

## ALABAMA.

## THE COAL AND IRON RESOURCES OF ALABAMA.

BY J. CARVILLE STOVIN, M. E.

In the few printed records of the minerals of Alabama the coal region has been divided into three separate fields, viz; the Warrior, Cahaba, and the Coosa or St. Clair, this is incorrect; there are only two distinct Coal formations, the Coosa being only a continuation of the Cahaba; originally the Warrior and Cahaba were one and the same, but became separated by the Silurian strata being thrown up between them, and they now form two fields.

I shall commence with a description of the Cahaba in the neighborhood of Montevallo station, on the Selma, Rome and Dalton Railroad, 57 miles North-east from Selma. On this Railroad at a point 55 miles from Selma, a branch railroad  $2\frac{1}{2}$  miles long runs to two openings upon Coal Seam "Numbered 8" on section No 1. One of these mines is owned by the Mobile and Selma Coal Company, and is a lift above water level, the coal averages from 6 feet 6 inches to 4 feet in thickness, is very hard, Semi-bituminous, red ash, free burning, non-coking and a good household fuel, but contains a considerable amount of sulphur. Being above water level no machinery for hoisting or pumping is required: the price paid for mining is one and a half dollars per ton, and the coal is blasted out of the solid, the output averaged for this year from seven to eight thousand tons and the coal sells in the market at from  $\$3\frac{1}{2}$  to  $\$4\frac{1}{2}$  dollars a ton.

The other opening which is on the same seam, was made by the Central Mining Co., and is  $\frac{1}{2}$  miles west, and reached by a narrow gauge road of one mile, the coal is conveyed thereon by a small locomotive of three foot gauge. The coal averages from 22 inches to 3 feet in thickness, is hard, semi-bituminous, free burning, non-coking, red ash, free from sulphur, burns to an impalpable ash leaving no cinder or clinker, and is as good a steam coal as any in the United States, not even excepting the Cumberland, rates of mining and selling, same as at other mine. The output for the year will be from twelve to thirteen thousand tons.

Both of these mines were opened during the

late War, but it was not until 1867 and 1868 that the Central mine sank a slope below water level, introduced machinery and constructed the narrow gauge road, under my direction and superintendence. The slope is 600 feet deep and in the coal, and dips with a descent of one foot in nine North  $2^{\circ}$  East. The strike being north-east and south west. The present mode of mining is Long-wall advancing, a system I introduced, banishing the old style, "Stall and Pillar," finding both the roof and floor suitable. The coal is hoisted by a double cylinder engine of 40 horse power, which I had to place underground, 90 feet vertical from the surface, and convey the smoke from the boiler up a shaft; the water is raised by a steam pump.

The principal market for these coals is the city of Selma and for household use; high freights on the Selma Railroad preventing it from reaching distant points: the Railroad Co., keep the branch road in repair, and charge for that and the 57 miles transportation to Selma, from \$1.80 in Summer to \$2.50 a ton in Winter. The true destination for this coal is one of the Gulf ports, probably Pensacola, distant from Montevallo 270 miles, to be sold as a Steam coal for Marine purposes, and when Southern railroads learn, that it is to their interest to have cheap coal freights, it will be carried there. These two mines are the only ones operating on the Selma, Rome & Dalton R. R.

At Calera, seven miles north east of Montevallo, the Selma R. and D.R. R. is crossed by the South and North R. R. which is a continuation of the Louisville and Nashville Railroad to Montgomery. On this road, 17 miles north of Calera, the Cahaba coal field is again reached at Helena Station, and there several small Companies are working (see section No. 2); they are all however on a small scale, and are drifting above water level, with the exception of the Cahaba Coal Company, who have a slope sunk in the coal 175 feet on seam "No. 9;" this is now filled with water on account of some legal trouble; all of these workings are on the Northern dip of the coal, and the average thickness and quality of the coal, I have shown on section "No. 2".

Crossing the Cahaba River, we find we have passed over the coal basin, and the coal now

dips South. "No. 9" on southern dip being worked by Messrs. Davis & Co., this is the same seam worked by the Cahaba Coal Company, but on opposite dip, and is here worked above water level; the coal is a coking coal of third or fourth rate quality, not very free-burning, and averages from 2 feet 6 inches to 3 feet thick. The next seam that is opened, is on "No. 6" on section No. 2, also above water-level, and a most excellent coal for blacksmiths use and for making coke, but is far too friable for either steamer or house-hold use. This coal is so soft, that it is mined for 75 cents a ton; all the other coals in the neighborhood having to pay from \$1.00 to \$1.25 a ton. This coal averages from 4 to 5 feet in thickness, and is three quarters of a mile from the road, to which it is transported over a tram road. The others are immediately upon the railroad. Not any of these companies average throughout the year over 20 tons a day each, and sell their coals at from \$3.50 to \$4.50 a ton in the cars.

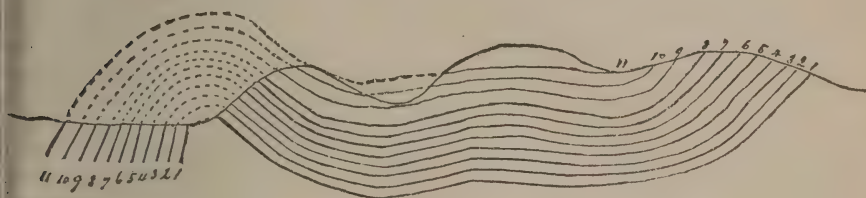
Leaving the coal formation, and still keeping on the South and North railroad towards Birmingham, in 5 miles we strike the Silurian Range, and in a deep cut notice nearly 30 feet of red hematite ore, and that the railroad embankment is composed almost entirely of iron ore. We now reach the furnaces of the Red Mountain Iron Co., 5 miles south of Birmingham at "Iron-ton", they are using the red fossiliferous ore smelted with charcoal by cold blast, and when their two furnaces are in blast produce 25 tons per day, of No. 1 car wheel iron. By analysis, this ore produces 42 per cent of metallic iron, needs no roasting, but is somewhat refractory, much more so than the Brown hematite. The bluff in which the red ore lies, runs alongside of the Alabama and Chattanooga Railroad; (a road from Tuscaloosa, Alabama, to Chattanooga, Tenn.,) for about 30 miles, and varying from 3 feet in thickness up to 30 feet. These furnaces are the only ones at present on the South and North road, but on the Alabama and Chattanooga road, 6 miles east of Birmingham, there is a furnace at "Irontale" leased by Messrs. McKee & Thomas of Pennsylvania, who are making a very superior iron from an equal admixture of the brown and red hematite, with charcoal and cold blast, turning out from 12 to 15 tons a day.

From Birmingham, proceeding towards Tuscaloosa, we reach the Brown hematite region in about 14 miles, and it appears to me impossible, in the short limits of my report to give any more than a very faint description of the vast and immense deposits of this mineral. The bed is eight miles long, with a base from three quarters to one mile wide, and from 200 to 300 feet in height; above water level. *In no part of the world*, can the manufacture of iron be conducted on a cheaper basis than in this neighborhood. By an extensive fault, the Silurian deposits have been uplifted between the Warrior and Cahaba Coal-fields. Limestone is in immediate proximity, and the choice of two coal-fields within four to five miles. In the Warrior field, no developments have been made until this present year, but enough has been already done to show six workable seams of coal, many of which are coking, varying from 2½ feet to 7 feet in thickness. The dip is slight compared with that of Cahaba, although the quality is not quite equal to some of the seams in the latter formation, most of the Warrior containing small bands of shale. I am however informed, that recently one of the upper series has been struck, with the Diamond drill, showing eight feet of coal free from slate, and a good coking coal. I will mention also that the true Scotch black band iron ore, 22 inches in thickness, has been found in the Warrior, (yielding a metallic percentage of 33;) below one of the seams, but not in immediate proximity. Exploration is being made in hopes of finding them close enough to work the two together, so as to render the extraction profitable. Besides the iron furnaces, I have mentioned, there are two others in operation in this State, working solely upon the brown hematite with cold blast, producing a car wheel iron unsurpassed by any and selling their iron at from \$50 to \$65 a ton. One situated seven miles from Columbiana, Shelby County, on the Selma R. and D. Railroad, and the other at Briarfield in Bibb County, 50 miles from Selma, and many others in progress of construction. I regret to state that no furnace has yet started, nor is there one yet in contemplation, to run upon the hematite ores with either coke or coal as fuel and the hot blast, being what is required to give the coal trade an



thus. Sales of Alabama coal for this year not exceed sixty thousand tons; this small amount filling the requirements. Excepting a few tons sent to Columbus, Georgia; and a few to Georgia; none has been exported, and Alabama cities are furnished with English Pittsburgh coal by water, at a cheaper rate than we can deliver by railway. The demand

last year was only 40,000 tons; the increase this year is entirely owing to South and North Railroad, using coal as fuel. Could we but induce iron masters to use our coal either in its raw state, or manufactured into coke, nothing forbids our springing into one of the first coal producing States in the Union, without that, our supply will exceed our demand.

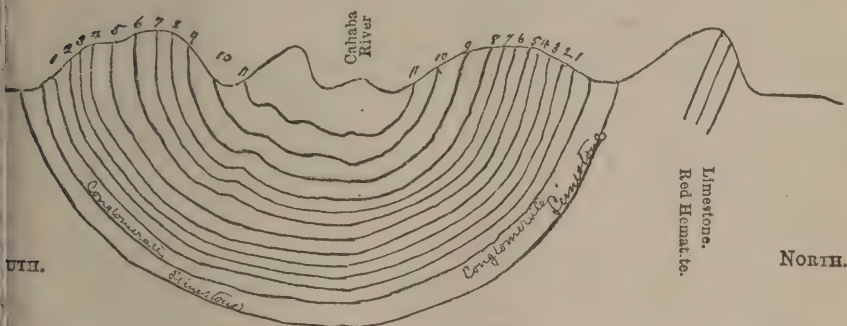


II.

Section No. 1.—Through centre of Cahaba Coal Field, from Selma, Rome and Dalton Railroad to Alabama and Chattanooga Railroad.

Coal Seam No. 8.—Worked on Northern dip by Mobile and Selma Coal Co., and Central Mining Company, near Montevallo, Ala.

NORTH.



III.

Section No. 2, on South and North Railroad. From Helena, North towards Birmingham.

Seam No. 1, on Northern dip, three to four feet in thickness, non-coking.

Seam No. 2, " " " "

Seam No. 3, " " " "

Seam No. 4, " " " "

Seam No. 5, not developed.

Seam No. 6, on Southern dip by Glasgow Coal Co., excellent coking coal, 5 feet thick.

Seam No. 7, not developed.

Seam No. 8, not developed.

Seam No. 9, on Northern dip by Cahaba Coal Co., on Southern dip by Davis & Co., coking coal, 2 ft. 6 in. to 3 ft. in thickness.

Seam No. 10, not developed.

Seam No. 11, not developed.

## CHICAGO COAL TRADE

The Coal trade at the garden city of the West is an ever increasing one, as may be seen from the statistics given elsewhere.

During the year 1873, business was unprecedentedly active, the aggregate of transactions being 25 per cent greater than in 1872. Up to the time of the panic it was the most profitable season known. The receipts of all kinds of coal will not vary much from 1,800,000 tons,

The great element of prosperity in the trade, outside of a first-class demand, was the unusually low rates of freight by lake. The season opened at \$1.00 per ton from Buffalo, and remained at that point till August, when it advanced to \$1.18 per ton. During the panic the rate rapidly declined, with the falling off in the demand for Westward bound freight room; till at last the point was reached where vessels were glad to bring coal as ballast, and some of them pay their own tow bills at that. In 1872 the rate of freight from Buffalo touched \$2.50 per ton. Owing to the lessened cost of moving, dealers did not so much feel the disadvantage arising from the combination among the owners of anthracite coal. The average price of coal in this market during the year was \$9.50 for hard, and \$7.00 for soft. The growth of the trade in coal is remarkable; it has more than doubled during the last five years. Very little wood is now used in Chicago, owing to the cheaper price of coal.

The following will indicate the enormous quantities of coal consumed in manufactures in Chicago. Chicago Gas Company, 50,000 tons; People's Gas Company, 40,000; Joliet iron and Steel Company, 48,000; Union Rolling Mills, 40,000; Meeker's Blast Furnace, 26,000; Chicago Plate and Bar Metal Manufacturing Company, 10,000 tons.

The following mines are owned by Chicago parties: Walnut Hill, of Pennsylvania; Lick Run, in Hocking Valley, Ohio; Laurel Hill and Coal Creek, in Indiana; and the Minonk and Wilmington, in Illinois. The proprietors of three of these mines own the cars in which their coal is transported to this city. The Chicago & Illinois River Railroad Company are rapidly pushing their line through the heart of the Wilmington coal regions.

The following are the varieties of coal used

and the ports or places from which they are received:

Briar Hill coal from Cleveland, O.	By La
Erie coal from Erie, Pa.	" "
Straitsville, Hocking coal	{ P. C. & St. L. R.
and similar coals, Ohio.	{ & P. F. W. & C. I.
Midway and Walnut Hill coal from Pa.	{ " "
Indiana Block coal from	{ C. D. & N. R. R.
Brazil Indiana & vicinity	{ I. C. R. R.
Wilmington coal from	{ C. & St. Louis R.
Wilmington Ill. & vicinity	{
Other Illinois in small quantities by	{ I. C. R. R. & C. & Q. R. R.

The above are the principal Bituminous coals

Briar Hill and Erie ranking first as a domestic coal in quality. Midway & Walnut Hill second. Hocking coal third. Indiana Block fourth. Illinois coals fifth. The four last are used as steam coals. The Illinois coals probably leading the others in quantity. The Midway and Hocking, being used very largely for same purpose, also Indiana Block coal.

Blossburg coal is also handled, and dealt with very extensively.

The following will show the average retail prices per ton for coal at Chicago, during the years given, and is valuable as but one set of books, dating so far back, was saved from the fire.

Year.	Anthracite Coal.		Erie Coal.	
	Summer.	Winter.	Summer.	Winter.
1849....			\$4 25	\$4
1850....			4 50	7
1851....			4 00	6
1852....			4 50	5
1853....			5 00	9
1854....	\$12 00	\$12 00	6 00	10
1855....	9 00	12 00	7 00	8
1856....	8 50	9 00	7 00	12
1857....	9 00	9 50	7 00	7
1858....	7 00	8 50	5 00	7
1859....	6 00	7 50	5 00	6
1860....	6 00	10 00	4 50	6
1861....	5 50	8 00	5 00	6
1862....	7 00	11 00	6 00	9
1863....	10 00	12 00	9 00	9
1864....	16 00	20 00	12 00	17
1865....	12 00	22 00	10 50	14
1866....	12 00	14 00	10 00	11
1867....	9 00	15 00	9 00	11
1868....	9 00	14 00	9 00	10
1869....	10 50	13 00	8 00	9
1870....	9 00	10 00	8 00	10
1871....	7 50	12 00	8 00	11
1872....	8 00	12 00	9 00	11
1873....	9 00	10 00	9 00	8

## CINCINNATI, OHIO.

There is an increasing business done in coal at this city. By the Chamber of Commerce, reports we learn that the receipts for the year ending September 1st, 1873, amounted to 37,274,497 bushels. This quantity consisted of the following.

Kinds.	Bushels
Youghiogheny.....	24,962,373
Ohio River and Kanawha.....	11,075,072
Cannel.....	1,162,052
Anthracite.....	75,000
Total.....	37, 274,497

The reader will observe that the imports of 1872-73, have increased over the preceding year 6,483,701 bushels. A small proportion of this is probably duo to more complete returns made during the past year, but the figures mainly exhibit an actual increase in the business. It, too, is a noticeable fact, that to this increase, the Youghiogheny coal contributes 5,707,657 bushels.

These unprecedented receipts would, under ordinary circumstances, have affected the price much more than has been witnessed. The average quotation for Youghiogheny, during the year, was 20.72c. During the preceding year it was 22. 68, showing the average during the past year to be about two cents less per bushel. It must be borne in mind, however, that these averages though they may answer for comparative purposes, from year to year, are not the average price paid for the coal. To arrive at the latter it would be necessary to know how much was sold at the respective prices, which can not be determined with our present facilities. To make up the average price from the average quotation would be to assume that equal quantities were disposed of throughout all seasons of the year. The average quotation for Youghiogheny afloat was 14 3-10c. per bushel.

The year opened September 1. with Youghiogheny selling, delivered, at 20c. per bushel. An advance set in late in September, which continued until the third week in October, when coal reached 27c. Late in October it declined to 20c., at which it remained until toward the close of November, when it reached 24c., and finally, late in December, rose to 28c., the highest point of the year. Prices though

January steadily gave way. In February coal was about 20c. throughout the month. In March it was 19c., and in April and the first half of May, was from 17c. to 18., the lowest point during the year. it soon rose to 20c., and varied little from this during the last three months of the year.

The consumption of coke, both for domestic and manufacturing purposes, is steadily increasing. The business of the year, including sales of Gas Company, Connelssville, McKeesport, and "city made" coke, and receipts not properly embraced in sales, reach 3,594,820 bushels.

The coal question is one of serious import. It is so intimately connected with the prosperity of the city, that to affect the former is at once to exercise an influence on both our business interests and domestic economy.

The shipments of coal from the city, not including coal in transit from other points, show an aggregate of 4,472,400, bushels. This is distributed in various directions, chiefly north of the Ohio river, and principally within radius about 110 miles. The demand for coal in the interior is steadily increasing. The growing scarcity and the high prices of wood, are driving the people to the consumption of coal. Many farmers, who a few years ago little dreamed of departing from the old wood-fires, are resorting to coal, even at high prices. The demand of this nature must rapidly increase, and to meet this growing want will be a matter to enter into the future discussion of this important economic question.

The following shows the number of bushels of coal, of all kinds, received at Cincinnati during the last twenty years:

	Bushels.
1853-54.....	8,158,000
1854-55.....	10,356,000
1855-56.....	7,500,000
1856-57.....	14,500,000
1857-58.....	15,000,000
1858-59.....	12,392,701
1859-60.....	14,600,000
1860-61.....	12,500,000
1861-62.....	8,500,000
1862-63.....	8,000,000
1863-64.....	15,975,366
1864-65.....	16,467,023
1865-66.....	18,022,990
1866-67.....	18,446,266
1867-68.....	17,500,000
1868-69.....	25,500,000
1869-70.....	30,300,000
1870-71.....	22,972,000
1871-72.....	30,790,796
1872-73.....	37,274,497



## COAL TRADE OF BALTIMORE.

From the city and port of Baltimore Md, an extensive business in coal, both Anthracite and Bituminous, is done. At Locust Point, the terminus of the Baltimore and Ohio Railroad on the environs of this fine city, is the shipping point for immense quantities of Bituminous coal from the Cumberland and Gas coal regions of Western Md., and Virginia.

The trade in Anthracite at present is entirely local, none being shipped from Baltimore to other and more distant points.

The Baltimore and Ohio Railroad Co., own upwards of 2,100 Iron coal cars; each in three compartments or "pots", together capable of carrying 10 gross tons of coal. The only coal mining company owning cars being the Potomac Coal Co., to the number of 100.

There is some 350,000 tons of Anthracite received at Baltimore, by the following routes:

From Millersburg—Lykens Valley Red Ash, in 1872—58,469 tons.

From Sunbury—White Ash—166,471 tons.

By Susquehanna tide-water canal 100,000.

From Port Richmond, Phila., say 15,000 tons.

The Anthracite is usually in first rate order, and of good quality; but little or no Lehigh coal reaches Baltimore. All the sales are at 2,240 lbs to the ton.

The shipments from Baltimore of Cumberland coal to foreign ports, was 54,363 tons in 1872; 20,207 tons in 1871, and for the year 1873, the shipments were nearly 100,000 tons.

From Millersburg, Pa., to Baltimore is 112 miles, and the rate of transportation charged ranges from \$2.25 to \$2.50 per ton, *gross*.

From Sunbury, Pa., to Baltimore the distance is 138 miles, and the rate of transportation is from \$2.50 to \$2.75 per ton, *gross*.

The changes in the rates of transportation on the Baltimore and Ohio Railroad, within the past eight years, have been as below; on coal for shipment:—

*Tons of 2,000 lbs.*

FEBRUARY 16, 1865—

Cumberland to Locust Point....	\$5 25
Piedmont " " ....	5 60
Newburg " " ....	8 50
Fairmont " " ....	9 00

MAY 11, 1865—

Cumberland to Locust Point ....	\$3 75
Piedmont " " ....	4 10
Newburg " " ....	6 50
Fairmont " " ....	7 00

MARCH 19, 1866—

Cumberland to Locust Point....	\$3 00
Piedmont " " ....	3 35
Newburg " " ....	5 50
Fairmont " " ....	6 00

MARCH 18, 1867—

Cumberland to Locust Point....	\$2 70
Piedmont " " ....	3 05
Newburg " " ....	5 00
Fairmont " " ....	5 50

MARCH 16, 1868—

Cumberland to Locust Point....	\$2 30
Piedmont " " ....	2 65
Newburg " " ....	4 50
Fairmont " " ....	5 00

The highest price at which the Cumberland coal was sold at Baltimore was in March, 1865, when the price was \$14.00 per ton, it rapidly declined until in December, of the same year, the price was but \$7.40 per ton.

Anthracite was sold at \$13.50 per ton for Lump coal in May, 1865. There has been no change in the tariff of the Baltimore and Ohio Railroad, on coal, since March, 1868.

Business of the Baltimore and Ohio Railroad Co., for the past ten years; showing the disposition of the coal that paid freight.

Coal for use of the company not included.

Rec'd at Locust Point.	To Baltimore.	Line Trade.
1862..... 150,987	8,740	978
1863..... 277,505	26,106	3,936
1864..... 302,277	56,181	1,103
1865..... 353,434	49,396	5,340
1866..... 620,888	77,856	20,967
1867..... 629,946	58,377	7,615
1868..... 696,465	39,766	29,780
1869..... 1,187,366	136,704	33,920
1870..... 1,069,390	113,929	36,319
1871..... 1,438,816	123,286	39,500
1872..... 1,482,240	60,630	118,889
1873..... 1,806,829	63,694	147,195

## THE DUTY ON COAL.

As there is no Anthracite imported, there is no duty levied. On Bituminous coal it is 75 cts. per ton gold, on the coarse coal, and the culm of coal 40 cents per ton gold, since August 1st, 1872; previous to that date it was \$1.25 per ton, and 25 per cent. *ad valorem*, respectively.

## BUFFALO. N. Y.

This large and growing city is already the shipping port for immense quantities of Anthracite and Bituminous coal. Her manufacturing enterprises are consumers of both qualities to an extent which would appear improbable, if we had not the valuable statistics prepared by the City Board of Trade, to prove their correctness.

There is a large shipping business done with ports at the far west, and the new line of railway to Emporium, Pa., distant 117 miles, will tend to increase this business, as this road opens up a coal region, of which Buffalo is the natural outlet.

From the returns of the Board of Trade for 1872, we take the following interesting facts and figures.

Receipts of Bituminous coal at Buffalo for n years.

	By Lake.	By Canal.
1863.....	71,323	12,451
1864.....	65,224	35,237
1865.....	68,141	42,322
1866.....	68,142	62,172
1867.....	101,108	67,124
1868.....	91,457	73,596
1869.....	99,460	108,972
1870.....	94,796	163,437
1871.....	88,517	80,660
1872.....	78,879	95,500

Receipts of Anthracite by canal at Buffalo 10 years.

1863....	123,319	1868....	318,353
1864....	154,214	1869....	112,914
1865....	143,968	1870....	177,027
1866....	248,713	1871....	102,185
1867....	223,718	1872....	190,994

Exports of Bituminous by canal at Buffalo 10 years.

1863....	20,125	1868....	59,766
1864....	30,043	1869....	62,690
1865....	23,283	1870....	65,900
1866....	50,202	1871....	60,522
1867....	57,495	1872....	53,198

The receipts of Bituminous coal at Buffalo the L. S. and M. S. R. R. were:

In 1871.....	76,063 tons.
In 1872.....	109,397 tons.

The receipts of Anthracite coal at Buffalo, rail were:

1869....	187,000	1871....	300,000
1870....	250,000	1872....	330,000

The following will show the opening of Canal and Lake Navigation at Buffalo, for 10 years.

Date.	Lake opened.	Canal opened.	Canal closed.
1863....	April 7.	May 1.	December 18.
1864....	" 13.	April 30.	" 8.
1865....	" 26.	May 1.	" 12.
1866....	" 28.	" 1.	" 12.
1867....	" 27.	" 6.	" 10.
1868....	" 11.	" 6.	" 7.
1869....	May 1.	" 6.	" 18.
1870....	April 16.	" 10.	" 8.
1871....	" 1.	April 24.	November 28.
1872....	May 6.	May 13.	" 30.

Comparative prices of coal at Buffalo. Retail in the city.

	1872.	1871.	1870.
Lump.....	\$ 7 05	\$8 15	\$7 40
Grate.....	7 30	7 80	7 40
Egg.....	7 30	7 90	7 50
Stove.....	7 30	7 75	7 25
Chestnut.....	7 55	8 25	7 25
Bituminous...	8 00	8 00	—

The coal received, is used for domestic use rolling mills, furnaces, factories and gas works, both in the city, and the interior; and the Anthracite, with the mines of which direct connection is had by railway at low rates of transportation, is sent to Chicago, Milwaukee, Duluth, etc, by the vessels carrying grain to Buffalo.

The following is the business for the year 1873. —

## RECEIPTS.

Anthracite by Canal.....	254,044
" " by Rail.....	479,885
Bituminous by Canal.....	125,000
" " by Lake.....	88,139
" by L. S. & M. S. R. R....	190,000

Total of all kinds 1,137,038

## SHIPMENTS.

There was reshipped by way of the Lake to Western ports, 495,000 tons. of Bituminous, and there was also 67,210 tone of Bituminous sent eastward by the Erie Canal.

The stock on hand January 1st. 1873, was estimated at 100,000 tons of all kinds; and the consumption of the city and vicinity is estimated at say 600,000 tons annually.

We are indebted to Wm. Thurstone, Esq., Secretary of the Board of Trade, at Buffalo, for the above figures.

## QUALITIES AND PRICES.

As showing the prices of coal and the different qualities dealt in, at various points we append the following figures taken from late issues of the COAL TRADE JOURNAL.

### AT PROVINCIAL PORTS.

Previous to the close of navigation, Province coal was quoted as follows, at the shipping ports, in gold: Block House, \$2.50; Acadia 3.00; Sydney 3.00; Albion 3.00; Lingan 3.00; Glace Bay and Caledonia 2.50; Nova Scotia 3.00; Victoria 2.50; Gowrie 2.25; Reserve 3.00; International 3.00. Schooner Pond, f. o. b. at Sydney, 3.50. Slack averages \$1.25 per ton

Freights to New York were \$4.50, and to Boston \$4.00 U. S. currency.

### SAN FRANCISCO COAL MARKET.

#### BITUMINOUS.

Liverpool.....	\$10 50 @ 11 00
West Hartley.....	17 00
Scotch.....	11 00
Cumberland in casks.....	\$22 50
Cumberland bulk.....	\$21 00
Australian.....	\$11 00
California.....	\$6 50 @ 8 50
Bellingham Bay.....	8 50
Seattle.....	10 00
Chili.....	10 00
Coos Bay.....	10 00

#### ANTHRACITE.

Lehigh \$17.50. Scranton \$16.00.

### BUFFALO, N. Y., COAL MARKET.

#### BITUMINOUS.

Walnut Hill Gas coal per ton.....	\$6 00
Youghiogheny Gas coal.....	6 00
Cannel.....	6 50
Catfish Lump.....	4 75
“ Nut.....	3 50
“ Nut and Slack.....	3 00
“ Slack.....	2 85
Connellsville coke.....	8 00
Beaver Gas coal.....	6 50
Brookfield Gas coal.....	7 00

For local trade, Anthracite, per 2,000 lbs, delivered; Grate \$7.55; Egg \$7.80; Chestnut \$7.80; Stove \$8.05.

### CHICAGO, ILL., COAL MARKET.

#### BITUMINOUS.

Blossburg.....	\$9 00
Brookfield, Ormsby and Erie.....	8 00
Indiana Block.....	6 00
Hocking Valley.....	6 00
Briar Hill.....	9 00
Illinois.....	6 00
Walnut Hill.....	8 00
Cannel.....	10 00
Wilmington.....	6 00
Minonk.....	8 00
Youghiogheny.....	8 00
Pittsburgh Coke.....	10 00
Connellsville Coke.....	10 00
Straitsville,.....	\$6.50 W., \$9.00

#### ANTHRACITE.

Lehigh \$11.00, Wilkesbarre Pittston, and Scranton \$10.00, Delaware & Hudson \$9.50 \$10.00.

### PITTSBURGH COAL MARKET.

#### BITUMINOUS.

Connellsville coal.....	\$2 50 per ton
Youghiogheny, at mines.....	\$2 00 per ton
“ at Pittsburgh.....	\$2 50 per ton
Coke on cars “ “.....	\$3 25 per ton
“ “ at ovens.....	\$2 25 per ton
Castle Shannon on Platform 9½c. per bushel	
Anthracite, say \$7.25 per ton, on cars.	

### CINCINNATI, O., COAL MARKET.

Youghiogheny per bushel deliv'd.....	10 00
“ “ afloat.....	11 00
Ohio River per bushel deliv'd.....	10 00
“ “ afloat.....	8c. @ 9 00
Gas Coke, at yards, per bushel.....	12 00
Kanawha and Pittsburgh.....	16 00
Cannel delivered.....	24 00
Cannel afloat.....	18 00
Anthracite.....	\$10.50 @ \$12.00 per ton

### ST. LOUIS COAL MARKET.

Prices at East St Louis. Delivered in St Louis, four cents per bushel extra.

#### BITUMINOUS.

Illinois Coal, re'ail.....	10 00
“ “ manufacturers.....	9 00
Big Muddy.....	14 00
Trenton.....	12½ 00
O'Fallon.....	10 00

#### ANTHRACITE.

Per ton, delivered in St. Louis.....\$13 00  
Missouri Cannel, delivered.....6 00



## Interesting Facts and Figures.

### CUBIC CONTENTS OF A TON.

Few persons have an idea as to the amount of coal that can be stowed in a given space. Manufacturers think they have not enough room, even though they may be offered a bargain. We therefore give an example of the manner in which it may be figured up. A shed room, 15 feet high, 18 feet wide, and 30 feet long, will hold 200 tons of Anthracite coal, and perhaps ten tons less of Cumberland. Thus,  $15 \times 18 \times 30 = 8100 \times 40 = 202\frac{1}{2}$ .

The average number of cubic feet required to stow a ton of coal is as follows:

#### BITUMINOUS.

Cumberland, maximum.....	42.3
do. minimum.....	41.2
Duffryn, (Welsh).....	42.99
Cannel, Lancashire.....	46.37
Blossburg, Pa.....	42.2
Hartley, Newcastle.....	44.
Pictou, Nova Scotia.....	45.
Pittsburgh, Pa.....	47.08
Sydney, Cape Breton.....	47.02
Clover Hill, Va.....	49.02
Cannelton, Indiana.....	47.
Scotch.....	43.08
Richmond, Va., (Midlothian).....	41.04

#### ANTHRACITE.

Peach Mountain.....	41.06
Forest Improvement.....	41.07
Beaver Meadow, No. 5.....	29.08
Lackawanna.....	45.08
Letigh Co's.....	40.05
Beaver Meadow, No. 3.....	40.07

#### COKE.

Natural of Virginia.....	48.03
Pittsburgh.....	70.09
Charcoal.....	104.

It is usually stated that a ton of coal, "in the hill" measures about a cubic yard, or twenty-seven cubic feet.

A prominent retail dealer in Philadelphia informs us that from many years experience, he finds the cubic contents of 2240 lbs of hard Lehigh coal, to be a little over 36 feet; an average Schuylkill W. A. 37 to 38 feet; Shamokin 38 to 39 feet; Miller, Greaff & Co., Lorberrry nearly 41.

### DATE OF CLOSING OF ERIE CANAL.

1824..	December 4th.	1850..	December 11th.
1825..	" 5th.	1851..	" 5th.
1826..	" 18th.	1852..	" 16th.
1827..	" 18th.	1853..	" 20th.
1828..	" 20th.	1854..	" 3rd.
1829..	" 17th.	1855..	" 10th.
1830..	" 17th.	1856..	" 4th.
1831..	" 1st.	1857..	" 15th.
1832..	" 21st.	1858..	" 8th.
1833..	" 12th.	1859..	" 12th.
1834..	" 12th.	1860..	" 12th.
1835..	November 30th.	1861..	" 10th.
1836..	" 26th.	1862..	" 10th.
1837..	December 9th.	1863..	" 9th.
1838..	November 25th.	1864..	" 8th.
1839..	December 16th.	1865..	" 12th.
1840..	" 9th.	1866..	" 12th.
1841..	November 30th.	1867..	" 20th.
1842..	" 28th.	1868..	" 7th.
1843..	" 30th.	1869..	" 10th.
1845..	" 29th.	1870..	" 8th.
1846..	" 25th.	1871..	" 1st.
1847..	" 30th.	1872..	" 1st.
1848..	December 9th.	1873..	" 21st.
1849..	" 5th.		

## BRIDGES AT BOSTON HARBOR.

Table giving the position of the Bridges and Draws of Boston Harbor, with the width of the draws:

Charles River Bridge, width of draw	44
Warren	30.8
Fitchburg Railroad	31
Boston and Maine Railroad	30
Eastern and Lowell	31
West Lowell	31
Craigie's	31
West Boston	30
Grand Junction	33
Brookline	30
River Street	30
Western Avenue	31
Old Cambridge	31

Miller's Creek.	
Eastern Railroad	20.8
Prison Point	31

Fore-Point Channel.	
Boston, Hartford & Erie, two draws each	41
Mt. Washington Ave., two draws, each	38
Federal Street	32.6
Old Colony Railroad	32.6
Dover Street	31
Canal Bridge, (above Adams)	32.8
Bridge at Boston Wharf (to Downers)	34

Mystic River.	
Chelsea, two draws	32-46
Malden	46
Eastern Railroad	46
Boston and Maine Railroad	46

Chelsea Creek.	
Meridian Street, two draws, each	58
Chelsea Street	34

Neponset River.	
Old Colony Railroad	30.4
Neponset Avenue	30
Granite Bridge	31

Fitchburg Railroad receives coal through two bridges.

Boston and Maine Railroad receives coal through three bridges.

Boston and Lowell Railroad receives coal through five bridges.

B. H. & E. R.R. receives coal below bridges.

B. & Albany & Old Colony receives coal through four bridges.

## COAL USED IN LONDON, ENGLAND.

For the year 1869	5,133,667 tons.
For the year 1870	5,579,671 tons.
For the year 1871	5,810,789 tons.
For the year 1872	5,900,690 tons.
For the year 1873 to Dec. 1	5,521,178 tons.

Comparison of yield of north and south dipping coal beds, in 1856, in Schuylkill County, Penna.

North Dip, 10 Collieries, Red Ash	84,732 tons
do. 5 " W'te Ash	91,222 "
South Dip, 48 " Red Ash	570,561 "
do. 26 " W'te Ash	745,231 "
N'th & S'th 11 " Red Ash	305,022 "
do. 5 " W'te Ash	120,101 "

The north dips are steeper in the Schuylkill basin than the south, and therefore more slipped and crushed, thinner and more broken. This is one of the principal arguments for the "Wave Theory of Rogers."

Volume of Gas obtained from a ton of coal etc.

	Cubic feet.	Sp. Gr.
Boghead Cannel	13,334	.42
Wigan Cannel	15,426	.73
Cannel	15,000	.58
Cape Breton	9,500	—
Cumberland	10,000	—
English mean	11,000	.24
Newcastle	10,000	.05
Kilkenny	12,500	.04
Oil & Grease	23,000	.67
Pictou & Sydney	8,000	—
Pine Wood	11,800	.66
Pittsburgh Coal	9,520	—
Resin	15,600	.66
Scotch Coal	15,000	.56
Virginia Coal	8,963	—
Wallsend	12,000	.42

## PENNSYLVANIA CANAL.

RATES OF TOLL PER TON.

Wilkesbarre to Lock Haven	74 cents.
" to Harrisburg	54 "
" to Columbia	64 "
" to Havre-de Grace	83 "
Sunbury to Lock Haven	70 "
" to Harrisburg	45 "
" to Columbia	61 "
" to Havre-de-Grace	81 "

The L. & S. scales at Penobscot, give the average weight of cars of each kind, and measurement of contents, the result is:

Lump	32.2 cubic feet per ton of 2,240 lbs.
Broken	33.9 " " "
Egg	34.5 " " "
Stove	34.8 " " "
Chestnut	35.7 " " "
Pea	36.7 " " "

## TABLE OF DATES

at which navigation has been resumed on the Hudson River, and the opening of the Erie and Northern Canals:

## HUDSON RIVER.

1837 March 27.	1856 April 11.
1838 March 19.	1857 March 18.
1839 March 25.	1858 March 29.
1840 Feb'y 25.	1859 March 13.
1841 March 24.	1860 March 6.
1842 Feb'y 4.	1861 March 5.
1843 April 1.	1862 April 3.
1844 March 18.	1863 April 7.
1845 Feb'y 24.	1864 March 11.
1846 March 18.	1865 March 17.
1847 April 7.	1866 March 20.
1848 March 22.	1867 March 24.
1849 March 18.	1868 March 20.
1850 March 10.	1869 April 3.
1851 Feb'y 25.	1870 March 29.
1852 March 28.	1871 March 8.
1853 March 23.	1872 April 3.
1854 March 17.	1873 April 10.
1855 March 27.	

## CANALS.

1850 April 22.	1862 May 1.
1851 April 15.	1863 May 10.
1852 April 20.	1864 April 30.
1853 April 20.	1865 May 1.
1854 April 1.	1866 May 1.
1855 April 1.	1867 May 4.
1856 April 5.	1868 April 23.
1857 April 6.	1869 May 6.
1858 April 28.	1870 May 10.
1859 April 15.	1871 April 24.
1860 April 15.	1872 May 13.
1861 May 1.	1873 May 17.

## VARIETIES OF COAL.

**Bituminous.**—This is a somewhat deceptive name; it does not mean that any bitumen or resinous pitch, soluble in ether, is contained in it, but that the gases, oxygen, hydrogen, and carbon, enter more largely into its composition than in Anthracite, and gives it a more gaseous character in burning.

**Semi-Bituminous.**—Is that particular kind of coal, while it yields coke and combustible gas, yet contains only 11 or 12, and always less than 18 per cent. of volatile combustible matter, and not less than 70, and never more than 84 per cent. of carbon.

**Anthracite.**—Contains 85 to 93 per cent. of carbon, rarely more than 7½ per cent. of volatile matter; in the extreme western portion of the basin a Semi-Anthracite containing as much as 10 or 15 per cent. has been found.

## COMPARATIVE RATES OF FREIGHT FROM ELIZABETHPORT WITH THE DEPTH OF WATER.

Au. u. ta,	Maine,....	2 40	9½ feet
Amesbury Point	Mass	....2 30	12 "
Baker's Folly	R. I.	....1 55	11 "
Boston,	Mass	....2 00	plenty.
Beverly,	"	....2 00	15 feet
Bath,	"	....2 00	25 "
Bangor,	Maine	....2 00	17 "
Biddeford	"	....2 25	9½ "
Bridgeport	Conn	....1 00 10 @	12 "
Commercial Point	Mass	....2 15	12 "
Charlestown,	"	....2 00 10 @	15 "
Chelsea,	"	....2 00 12 @	15 "
Cambridgeport,	"	....2 00 10 to 11	"
Cohasset Narrows,	"	....2 25	10 "
Calais,	Maine	....2 00	20 "
Danversport	Mass	....2 20	9½ "
Dorchester Point,	"	....2 25	9 "
Dighton,	"	....1 60	10 "
Derby,	Conn.	....1 25	6½ "
Deep River,	"	....1 30	8½ "
Fall River	Mass	....1 45	10 "
Gardner,	Maine	....2 25	10½ "
Haverhill,	Mass.	....3 00	7 "
Hingham,	"	....2 35	8½ "
Hyannis,	"	....2 30	8 "
Hallowell,	Maine	....2 40 10 @	12 "
Hartford,	Conn.	....1 55	7½ "
Ipswich,	Mass.	....2 50	9 "
Kennebunkport,	Maine	....2 25	11 "
Lyons,	Mass.	....2 30 8½ to	14 "
Marblehead,	"	....2 15	12 "
Medford,	"	....2 40	9½ "
Malden,	"	....2 50	9 "
Middletown,	Conn.	....1 35	9 "
Milford,	"	....1 10	7 "
Mystic,	"	....1 30 8 @	14 "
Nantucket,	Mass.	....2 30	8½ "
Neponset,	"	....2 25	9½ "
Newburyport,	"	....2 20	15 "
New Bedford,	"	....1 60	10½ "
Newport,	R. I.	....1 50 9 @	16 "
New London,	Conn.	....1 35	20 "
Norwich,	"	....1 45	9 "
Norwalk,	"	....1 00	7 "
New Haven,	"	....1 00 7 @	10 "
Portsmouth,	N. H.	....2 15	15 "
Portland,	Maine	....2 00	20 "
Plymouth,	Mass.	....2 25	10 "
Providence,	R. I.	....1 50	11½ "
Pawtucket,	"	....1 65	9½ "
Quincy Point,	Mass.	....2 20	12 "
Roxbury,	"	....2 25	12 "
Rockland,	Maine	....2 00 9 @	9½ "
Rockport,	"	....2 10	11½ "
Salem,	Mass.	....2 00 10 @	15 "
Salisbury,	"	....2 50	12 "
Stonington,	Conn.	....1 40	10½ "
Saco,	Maine	....2 50	9½ "
Stamford,	Conn.	....1 00	7 "
Southport,	Conn.	....1 00	7½ "
Thomaston,	Maine	....2 00	2 "
Taunton,	Mass.	....2 00	6½ "
Weymouth,	Mass.	....2 25	9 "
Wareham,	Mass.	....1 60	7 "



## COAL TRADE OF THE N. Y. CANALS.

MR. JAMES MACFARLANE, furnishes us with the following interesting tables of the Statistics of the Coal Trade on the New York Canals, derived from the Reports of the Auditor of the Canal department.

Year.	Total tons of Coal Shipped by Canal.	Tons going West & North from Tide water	Tons arriving at Tide water	Tons going East from Buffalo, Gas Coal.
1834.....		1,102		
1835.....		5,973		
1836.....		5,436		
1837.....		6,460		
1838.....		6,472		
1839.....		7,504		
1840.....		6,054		
1841.....		9,338		
1842.....		7,714		
1843.....	20,271	9,738	6,523	
1844.....	29,231	14,939	9,240	3
1845.....	47,055	16,809	23,899	976
1846.....	33,923	17,599	9,423	1,643
1847.....	64,378	32,359	16,290	783
1848.....	75,821	39,592	16,073	3,450
1849.....	70,326	37,531	15,137	1,495
1850.....	80,127	46,722	16,073	3,999
1851.....	112,277	67,204	13,055	4,230
1852.....	145,296	69,923	7,411	5,898
1853.....	225,517	95,333	15,137	10,413
1854.....	275,562	92,06	42,902	15,548
1855.....	290,775	95,746	18,034	10,798
1856.....	305,343	142,692	27,079	9,730
1857.....	384,729	116,211	14,080	14,064
1858.....	335,176	144,276	14,736	16,389
1859.....	412,075	142,496	57,119	36,943
1860.....	490,495	154,928	72,783	26,074
1861.....	512,150	170,795	63,803	38,030
1862.....	636,740	173,331	75,242	28,957
1863.....	732,657	232,807	70,827	20,125
1864.....	835,063	268,772	85,336	30,043
1865.....	720,693	249,414	62,894	28,283
1866.....	1,136,613	367,296	124,960	50,203
1867.....	1,283,231	463,932	138,460	56,445
1868.....	1,611,089	600,677	126,031	59,766
1869.....	1,324,408	634,624	22,432	6,490
1870.....	1,553,185	567,503	19,798	65,895
1871.....	1,194,037	392,153	39,207	60,522
1872.....	1,292,770	582,529	34,075	53,193

Statistics of the Anthracite and Bituminous Coal Trade, on the New York Canals,

Year.	Tons arriving at Tide-Water		Tons Shipp'd		Total Tons Shipped—All kinds.
	Anth'e	Bitu's	Anth'e	Bitu's	
1863.....	8,493	62,389	434,136	234,521	732,657
1864.....	11,806	73,530	485,582	369,481	855,063
1865.....	10,806	52,515	413,152	287,531	720,693
1866.....	14,214	110,746	690,612	446,001	1,126,613
1867.....	13,774	124,686	773,146	509,474	1,283,231
1868.....	17,774	108,261	1,057,388	554,301	1,324,084
1869.....	22,432	131,084	656,104	618,304	1,324,403
1870.....	19,798	143,445	896,260	661,925	1,558,185
1871.....	39,207	54,800	602,044	591,993	1,194,037
1872.....	34,075	81,475	736,973	555,797	1,292,770

## USE OF COALS IN THE UNITED KINGDOM

According to the figures in the report of the Royal Commissioners appointed to inquire into matters relating to coal, every 1,000 tons raised in this kingdom is disposed of as follows:

In paper making and tanning.....	
"smelting copper, lead, tin and zinc.....	
"water works.....	
"breweries and distilleries.....	
"chemical manufactures.....	
"railway work.....	
"steam navigation.....	
"articles of clay and glass, and lime kilns.....	
"textile fabrics—of wool, cotton, silk, flax, and jute.....	
"gas works.....	
"mining operations.....	
"coal exported to foreign countries.....	
"general purposes, chiefly steam engines.....	
"domestic use.....	
"iron and steel works, inclusive of that required for their steam power.....	

Mr. Robert Hunt, in his "Mineral Statistics of the United Kingdom," gives the following proportions of coal raised by each county:

	Per cent.
Northumberland, Durham, and Camberland.....	
Gloucester, Shropshire, Stafford, Worcester, Warwick.....	
Welsh Counties.....	
Scotland.....	
Lancashire and Cheshire.....	
Yorkshire.....	
North Midland.....	

## COMPARATIVE ANALYSIS OF COAL.

Mr. I. W. Morris, of Philadelphia, gives the following table showing the relative value of coals found on the Pacific coast, with our East coal:

	A.	B.	C.	D.	E.
Alaska.....	7.94	7.96	60.0	40.0	12.3
Coos Bay.....	10.24	7.35	60.7	39.3	6.2
Seattle.....	8.38	8.57	63.0	37.0	16.6
Black Diamond....	8.38	8.73	51.6	48.4	8.0
Bellingham Bay....	10.53	5.51	67.0	33.0	16.0
California Anth....	9.70	6.12	88.6	11.4	5.0
Cumberland. Md....	13.92	3.52	88.2	11.8	3.2
Penn Gas Coal.....	14.67	13.78	62.5	37.5	3.2
Anthracite.....	7.40		95.6	4.4	7.2
Crude Petroleum....	20.90				1

## EXPLANATION—

A.—Heating power, 1 pound water. B.—Sulphur to ton, in pounds. C.—Coke per cent. D.—Volatile matter. E.—Ash per cent. F.—Relative value per pound.

## QUALITY OF COAL IN NOVA SCOTIA.

## CUMBERLAND COUNTY.

gins C. M. Association,	Steam and Iron.
w York and Acadia, (some Gas,) "	"
ring Hill,	"

## PICTOU COUNTY.

neral M. Assoc'n, of London, Gas, Iron & Steam.	
adia C. M. Co.,	Steam.
tercolonial C. M. Co.,	"
le Coal Mining Co.,	"

## CAPE BRETON.

ockhouse C. M. Co.,	Gas and Steam.
ledonia C. M. Co.,	"
rdner C. M. Co.,	Steam.
ternational C. M. Co.,	Gas and Steam.
agan Mining Association,	"
dney Mining Association,	Steam and Iron.
ctoria C. M. Association,	"
imney Corner,	"

We have only room for a few of the chemical analysis of these coals.

	Fixed Carbon.	Vol. Matter.	Ash.
ercolonial.....	64.	28.	4.
ernational.....	56.5	28.5	5.
serve.....	59.5	34.5	6.
ooner Pond.....	61.9	35.4	2 7

## COAL FIELDS OF THE UNITED STATES OF AMERICA.

	Square Miles.
w England basin.....	500
nsylvania Anthracite.....	472
palachian basin :	
Pennsylvania section.....	12,302
Maryland section.....	550
West Virginia section.....	16,000
Ohio section.....	10,000
East Kentucky section.....	8,983
Tennessee.....	5,160
Alabama.....	5,330
Michigan basin.....	6,700
Illinois basin :	
Illinois section.....	36,800
Indiana section.....	6,450
West Kentucky section.....	3,888
Missouri basin.....	26,887
Texas basin.....	4,500
Idaho.....	18,000
Nebraska.....	3,000
Nebraska.....	17,000
Kansas.....	9,043
Virginia.....	185
North Carolina.....	310
The total coal area is 192,000 square miles. The	
total production of coal, according to the census	
reports for 1869-70, was 33,310,905 tons.— <i>Vide</i>	
ACFAILLANE.	

## COAL IN COLORADO.

The best coal yet discovered in Colorado is that found near Canon City, and extending from that point southward to and probably beyond the Ray-ton Mountains. Like that in the vicinity of Denver it is of the lignite variety, and yet very different in its nature. The former is soft and readily crumbles into small pieces, and upon continued exposure disintegrates and loses much of its carbon. The Canon City coal is as black and glossy as the St. Louis coal and much harder. It withstands the action of the atmosphere and can therefore be stored for any length of time. It burns even more readily than the Denver coal, but with more soot and smoke, but throws off no sulphurous vapor. Analysis shows it to contain of fixed carbon 53.90; volatile matter 87.20; ash 4.00, and of sulphur only .16.—*Denver Herald*.

## KANAWHA, WEST VIRGINIA.

The Kanawha coal fields embrace about eight thousand square miles, and present, in aggregate strata, above the water level, over seventy feet of coal. Prof. Rogers pronounced this the most remarkable deposit in the United States, and Prof. Ansted, the distinguished English geologist, who visited the Kanawha, estimates the deposits at 55,000 tons of coal per acre. Three varieties of coal occur—cannel, splint, and bituminous. The cannel is equal to the best foreign production.

## COAL IN RUSSIA.

The chief centres of the Russian coal supply, are as follows:—In the south, the basin of the Lower Don, which contains 16,000 square miles of the finest Anthracite; in the west, the governments of Kiev and Kharkoff; and further to the north, the great Central, or Moscow basins, comprising the governments of Tver, Kalouga, Moscow, Riazan, Tula and Novgorod, and extending northward as far as the Dwina. The official estimates made in December, 1871, rate the supply as follows:—Basin of the Lower Don, 15,000,000,000 poods (the pood being 36lb. English); Government coal-fields of Poland, 516,000,000 poods; Moscow basin, 15,000,000,000 poods; Kiev Government, 80 miles of superficies by 21 feet of thickness (actual contents not specified.) To these items may be added those of the Kharkoff and Ekaterinoslay beds of Anthracite and private coal-fields of the "Privis linski Krai" the districts lying to the east of the Vistula.

## COAL IN NEW ZEALAND.

The extent of the New Zealand coal deposits is comparatively great. In the Gray River district

the quantity of coal obtainable, without sinking, is at least 4,000,000 tons, while in Canterbury about 3,000,000 tons can be obtained as easily.

### PENNSYLVANIA. ITS COAL RESOURCES.

Twenty-five counties in Pennsylvania contain no coal whatever, viz: Philadelphia, Delaware, Chester, Montgomery, Bucks, Northampton, Lehigh, Berks, Lebanon, Lancaster, York, Adams, Franklin, Cumberland, Mifflin, Juniata, Perry, Snyder, Union, Montour, Monroe, Pike, Wayne, Susquehanna and Erie. They are all situated in the southeastern part of the State, except Erie in the northwestern corner. The Anthracite coal of Pennsylvania is principally in the four counties of Dauphin, Schuylkill, Carbon and Luzerne; with smaller quantities, in Northumberland and Columbia Counties, there is semi-anthracite coal in Sullivan and a little in Wyoming County.

Six counties contain detached fields of semi-bituminous coal, Bradford, Lycoming, Tioga, Huntingdon, Bedford and Fulton. Twenty-seven counties in the western and northwestern part of the State contain Bituminous coal, viz: Somerset, Fayette, Greene, Washington, Westmoreland, Cambria, Indiana, Armstrong, Alleghany, Beaver, Lawrence, Butler, Clarion, Jefferson, Clearfield, Blair, Centre, Clinton, Cameron, Elk, Forest, Venango, Mercer, Crawford, Warren, McKean and Potter. Its total area is 12,222 square miles, besides 80 miles in Broad Top, and 472 in the Anthracite fields, making a total of 12,774 square miles of coal of all kinds in Pennsylvania.—*Vide MACFARLANE.*

We find in Johnson's "Analysis of American coals," the figures showing the average number of cubic feet in the ton, of Anthracite coal, to be 43-16, thus:

Lykens Valley.....	46-13
Lackawanna.....	45-82
Old Co.'s Lehigh.....	40-49
Peach Mountain R. A.....	41-64
Forest Impt. Co.....	41-74

### HOW TO OBTAIN A QUANTITATIVE ANALYSIS OF COAL.

A common analysis consists in determining moisture, volatile combustible matter, fixed carbon, ash, sulphur and phosphorus.

*Moisture (H<sup>2</sup>O) Determination.*—Heat about 1 gram for fifteen minutes and weigh; then heat again for ten minutes and weigh; do this several times and take the lowest weight; this must be done at a temperature of 100° C. Loss in weight—H<sup>2</sup>O.

*Determination of Volatile Matter.*—Heat 2 gram in a platinum crucible (the heat should be sufficient to heat to redness), keeping the crucible covered; heat three minutes and a half over a Bunsen burner, then three and a half minutes over a blast lamp, and weight. Loss in weight represents volatile matter.

*Determination of Ash.*—The ash is determined by burning the residue from last operation until it is no longer black, then weigh. Weight will represent the ash.

*Sulphur and Phosphorus Determination.*—For both take 3 grams of coal. Ignite with 8 parts of Na NO<sub>3</sub> x 16 parts of Na<sub>2</sub> CO<sub>3</sub> in a porcelain crucible; put into the crucible small quantities at a time. Dissolve residue in H<sub>2</sub>O acidulated with HCl, and divide the solutions one-third for sulphur determination, two-thirds for phosphorus.—*Journal of Applied Chemistry.*

The following table of the comparative value of California coals has been determined by a series of careful experiments made by the United States government at Mare Island. The experiments were made with reference to determining the amount of the several kinds of coal which would be required for a calorific equivalent to a cord of the best oak wood:

	Pounds.
Nanaimo. Vancouver Island. B. C.....	1,800
Bellingham Bay, Washington Territory.....	2,200
Seattle, Washington Territory.....	2,400
Rocky Mountain, Utah.....	2,500
Mt. Diablo, California.....	2,600
Coos Bay, Oregon.....	2,600

### McLEAN COUNTY, ILLINOIS.

Numbers of acres of workable coal-lands in McLean county, 774,235; number of veins of coal, 3; depth of first vein, 288½; thickness, 3½ feet; depth of second vein, 388½ feet; thickness, 4½ feet; depth of third vein, 520 feet; thickness, 3 feet; mining is by shaft.

### JOHNSTOWN, PENNSYLVANIA.

At Johnstown, in Cambria county, on the Pennsylvania Railroad, 78 miles east of Pittsburgh and 276 miles west of Philadelphia, is one of the finest developments of the coal and iron resources of Pennsylvania. In the year 1871 there was mined at Johnstown 263,472 tons of coal, all of which was used there mainly in the manufacture of pig iron and rails. The thickness of the lower coal found at this point measures from seam A to E 308½ feet, containing 20 feet of coal.—*Vide MACFARLANE.*



## PHILADELPHIA AND READING R. R. CO.

The following table will show the number of tons of 2240 lbs., carried by this company; gross receipts from coal transportation; number of miles of main line open; from 1870 to 1873, inclusive.

	Tons.	Dollars.	Miles.
0.....	1,351,502	2,071,731	95
1.....	1,650,270	2,518,871	95
2.....	1,650,912	2,150,677	98
3.....	1,582,248	2,254,694	98
4.....	1,987,854	3,253,823	98
5.....	2,213,292	3,664,095	98
6.....	2,088,903	3,242,458	98
7.....	1,709,692	2,412,923	98
8.....	1,542,646	1,865,693	152
9.....	1,632,932	1,883,685	152
0.....	1,946,195	2,328,158	152
1.....	1,639,535	2,111,023	152
2.....	2,310,990	2,879,120	152
3.....	3,065,261	4,897,200	152
4.....	3,065,577	7,203,775	152
5.....	3,090,814	8,627,292	152
6.....	3,714,684	8,245,697	152
7.....	3,446,826	6,404,878	152
8.....	4,574,874	6,252,224	152
9.....	4,239,457	8,346,240	152
0.....	4,633,504	6,498,871	152
1.....	6,002,573	8,287,293	260
2.....	6,185,434	7,513,115	323
3.....	6,546,553		323

The year ends with Nov. 30, in all cases.

The average price per ton received by this company, on coal carried during the year ending Nov. 30, 1872, (based upon the business of the main line,) was \$1.544-10, and the average per ton for the same time was \$1.364-10. The average per ton received in 1871 was \$1.38-10, and the average for the previous ten years was \$1.94 per ton.

## DISTRIBUTION.

The coal was distributed as follows:

Line.	Philadelphia.	Port Richmond.
... 548,755	388,352	2,128,154
... 634,074	373,070	2,058,423
... 659,376	380,283	2,051,202
... 836,598	475,189	2,402,897
... 935,694	386,933	2,121,189
... 597,903	697,277	2,113,581
... 923,504	888,663	2,362,972
... 1,074,400	785,585	1,893,035
... 1,128,227	923,539	2,311,393
... 1,357,208	998,212	2,223,137
... 1,670,188	1,075,255	2,266,892

## LEHIGH CANAL COAL TRADE.

Report of coal carried through the Lehigh Canal for the year ending Dec. 5, 1873.

From	Week.	Year.
Mauch Chunk Region.....		235,485,15
Beaver Meadow ".....		131,534,15
Mahanoy ".....		20,891,01
Hazleton ".....		199,891,02
Upper Lehigh ".....		29,258,07
Wyoming ".....		118,541,16
Total.....		736,251,13
Same time last year.....		767,094,04

The distribution was as follows:

Consumed on line of Lehigh Canal..	81,395,00
Passed into Morris C'l to Tidal p'ts..	2,613,17
" " " " Local ".....	28,233,05
" " " " D. & R. " Tidal ".....	257,797,15
" " " " Local ".....	13,566,01
Consumed on line Del. Div. Canal..	39,661,11
Passed through to Bristol.....	312,984,04

Total.....736,251,13

## BREAKING STRAIN OF WIRE ROPE.

## ROPES OF 133 WIRES.

No.	Circum. Inches.	Diam. Inches.	Strength. Tons.
1.	6 $\frac{3}{4}$	2 $\frac{1}{4}$	74.00
2.	6	2	65.00
3.	5 $\frac{1}{2}$	1 $\frac{3}{4}$	54.00
4.	5	1 $\frac{1}{2}$	43.60
5.	4 $\frac{3}{8}$	1 $\frac{1}{8}$	35.00
6.	4	1 $\frac{1}{4}$	27.20
7.	3 $\frac{1}{2}$	1 $\frac{1}{8}$	20.20
8.	3 $\frac{1}{8}$	1	16.00
9.	3	$\frac{7}{8}$	11.40
10.	2 $\frac{1}{2}$	$\frac{3}{4}$	8.64
10 $\frac{1}{4}$ .	2	$\frac{3}{8}$	5.12
10 $\frac{1}{2}$ .	1 $\frac{5}{8}$	9-16	4.27
10 $\frac{3}{4}$ .	1 $\frac{1}{2}$	$\frac{1}{2}$	3.48

—JOHN A. ROEBLING'S SONS.

Weight of T. rails in pounds per yard, and in tons of 2,240 lbs per mile.

	Tons. lbs.
At 16 lbs per yard it requires 25.325	per mile.
At 18 " " " 23.640	per mile.
At 20 " " " 31.660	per mile.
At 22 " " " 34.1280	per mile.
At 25 " " " 39.640	per mile.
At 28 " " " 44.	per mile.
At 30 " " " 47.320	per mile.
At 33 " " " 51.1920	per mile.
At 45 " " " 65.960	per mile.
At 48 " " " 75.960	per mile.
At 68 " " " 106.1920	per mile.

1873.

## THE STATE OF TRADE AND REVIEW.

January 8.—Trade quiet. Prices same as in Dec. Proposed pooling of coal by the Reading Co., creates excitement. 70,000 men on strike in England.

January 15.—Business quiet, improved enquiry for coal. Schuylkill basis for 1873 settled. Continued excitement regarding Reading matters. Several failures among retailers.

January 22.—The arrangement between the companies as to combination and price of coal settled: much excitement and comment by the Press. B. Hammett died.

January 29.—Active market for Bituminous at \$9 at New York. Prices advanced for Anthracite for February. Vessels scarce and freights high, hindering shipments. Heavy advance at Auction sale.

February 5.—Programme fairly inaugurated, prices advancing. Trade fair. Much comment by the Press. Coal famine at Memphis.

February 12.—Increased demand at Wholesale and Retail. Gascoals scarce. Strike in Wales, 70,000 men out. No receipts allowed to Port Richmond. Prices rising in England.

February 19.—Trade fair, prices steady. Vessels scarce, freights high. Shipments prevented by continued cold weather.

February 26.—Excellent inquiry for coal, supply short. Bituminous active, sales noted at \$15 per ton. Auction sale averages nearly as last month. Pennsylvania prices for March, sixty cents higher than in February. Reading circulars for 1873 issued.

March 5.—Trade steady at the new prices. Talk of supplying Bituminous to the West Indies in place of English coal, formerly in use. Manufacturers do not contract. Retailers are taking Pool coal.

March 12.—Vessels scarce, freights high, demand good. Advance in the Bituminous coals, owing to increased Railroad tolls. Mining is more active. The strike at Pittsburgh on screen-bill, continues.

March 19.—Reduction in vessel freights. Considerable trade doing. Shipments of Bituminous to West Indies.

March 26.—Cumberland \$7 25 at New York.

Business unsettled, owing to the new prices for April, having been reduced to a basis for the years business. Freight lower. Decrease in production 29,956 tons as against 1872.

April 2.—Trade does not move very lively at the new rates. Coal reported scarce at Inland points. Stocks on hand, small. Transportation will be advanced. Coal scarce in England and much excitement.

April 9.—Trade quiet. Advanced prices noted for Nova Scotia. The combination find hard work to induce customers.

April 16.—Continued inaction. Vessels plentiful, Collieries drowned out in the Schuylkill region. Mr. Wm. Grant killed by fall of rock. Borden shaft destroyed by fire.

April 23.—Business fair, prices for May advanced. Schuylkill coal reported particularly inactive. Coal at London England; 31s.

April 30.—Considerably more business doing at April rates. Extensive breaks in the Oswego Canal. Advance at Auction sale to day.

May 7.—Trade quoted dull. Vessels scarce. Shipments commenced from Nova Scotia. Opening of canal and lake navigation.

May 14.—Trade continues quiet. Much comment on the combination by the Press. 140,000 tons on hand at Port Richmond. Terrible colliery accident at Nova Scotia.

May 21.—Anthracite quiet. Vessels scarce. Prices for June advanced. Rates are 80 cents over May, 1872. Cumberland active. Death of Col. Alfred Day.

May 28.—Anthracite continues quiet: shipments larger in anticipation of June rates. Advance in tolls. Cumberland demand in excess of supply. Coal declining in England; wholesale prices at London 27s. New rules for employees of Reading Co., threaten a strike.

June 4.—An improved trade in Anthracite. Nova Scotia prices further advanced. The combination are making larger sales. Increased production over 1872, thus far is 235,077 tons.

June 11.—Business generally quiet, although many sales are being made. Vessels in full supply, rates keep up. Accident at Henry Clay colliery. Reading Railroad Excursion.

June 18.—Larger business reported for the week. Coal trade of Pittsburgh this year 37,735,000 bushels; during the whole of 1872 was 57,280,000 bushels.

June 25.—Rates for July advanced, Trade even, demand increasing, Larger business June than was expected. Tolls advanced. Auction sale averages 13 cents over May. New coal law in operation at Pittsburgh.

July 2.—Trade quiet in Anthracite. Vessels short supply. Orders to fair amount on hand. Provincial freights higher. Miners on strike in Maryland and Westmoreland.

July 9.—Trade inactive; production reduced. Prices very low for Eastern coals at San Francisco, Cal. Coal at London, Eng. 29s.

July 16.—Continued inactivity in Anthracite. Business fairly active, Rumors of strike in Anthracite regions. Men at Pittsburgh threaten strike on the screen bill.

July 23.—Trade dull. Prices advanced for August. Vessels in good supply at lower rates. Orders coming in very moderately. Stock at Richmond 86,000 tons.

July 30.—Improvement noticed. More coal being delivered. Bituminous productions increasing. Tolls advanced for August. Coal at London, 33s. Auction Sale, advances.

August 6.—Fair trade doing. Nearly all the miners near Pittsburgh on strike.

August 13.—Trade moderately active. Delay in shipment. Freights lower.

August 20.—Fair trade in Anthracite. Bituminous quiet. Orders more plenty. Prices advanced for September.

August 27.—Increased business doing. The Nova Scotia mines active, doing a heavy increase in 1872. Auction Sale does not advance equal to other price lists.

September 3.—Trade fair, business increasing. The strike of the mines near Pittsburgh resumed. Rumors to extend the Chesapeake and Ohio Canal from Cumberland to Pittsburgh.

September 10.—Greater activity noticed in all varieties. Cumberland scarce and higher, owing to break in Ches. and Del. Canal.

September 17.—Anthracite brisk. Bituminous in request. Death of Hon. Lewis Audenried. Chesapeake and Delaware canal re opened.

September 24.—Business quiet. Financial panic. Auction Sale to-day does not advance as expected.

Oct. 1.—Business quiet, owing to the Panic. Prices steady; Freights advanced. Increase on exports over 1872, 970 720 tons.

Oct. 8.—Trade moderate. Iron furnaces are

reducing and stopping. The miners near Pittsburgh, still on strike.

Oct. 15.—Fair business in all kinds. Seizure of coal barges by Revenue officers, for taxes. Production keeps up, increase to this date over 1872, 1,157,808 tons.

Oct. 22.—Prices are advanced on Stove coal only. Anthracite found at the West. Coal at London, 31s.

Oct. 29.—Auction sale holds up to last month. In order to steady prices, a reduction is ordered in production. Anthracite sold at Pittsburgh.

Nov. 5.—Trade quiet. Coal found at the Cape of Good Hope, sells for \$26 per ton. The coal production of the Globe is upwards of 223,000,000 tons.

Nov. 12.—Production falling off. Concessions made in sales at N. Y. St. Louis receives weekly 680,000 bushels of coal. Many Anth. collieries not at work. Freights inactive and lower.

Nov. 19.—A better enquiry for Anthracite. Pittsburgh prices for Dec. reduced sixty cents. A cargo of Anth. sold at San Francisco for \$17 on the market one year. British coal production in 1872, 123,392,000 tons.

Nov. 26.—Trade moderately active, although the action of Penna. Co., unsettles matters. Production is falling off. The strike at Pittsburgh settled. Imports of coal at N. Y. this year 158,715 tons. Del. & Hudson Canal closed. Auction sale falls off.

Dec. 3.—Anthracite reported more active. Strike of Brakeman on L. Valley, and Reading R. R., checks shipments. Freights continue firm. Bituminous coal inactive.

Dec. 10.—Trade quiet. Western miners are shutting down for want of orders. Prices are not changed from Nov. price lists.

Dec. 17.—Strike of train hands continues to check the shipments of Anthracite. Iron more active. The prospects of a demand for coal is better. Lehigh Nav. Co's. property sold to C. R. R. of N. J. Nova Scotia production largely in excess of last year.

Dec. 24.—Anthracite remains unchanged. Stocks are accumulating at shipping ports. Bituminous at the East, very slow of sale. Few transactions are recorded.

Dec. 31. All qualities in little request. Collieries shutting down. Basis of wages for 1874 agitated. Prices for January unchanged.



# Monthly Prices of Stove Coal.

## PENNSYLVANIA COAL CO.

	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1852.....			3 65	3 65	4 05	4 05	4 15	4 15	4 15	4 15
1853.....			3 80	3 80	3 90	3 90	4 00	4 00	4 00	4 15
1854.....			4 75	4 75	4 85	4 85	4 95	4 95	4 95	4 95
1855.....			5 00	5 00	5 10	5 10	5 20	5 20	5 20	5 20
1856.....			4 50	4 50	4 60	4 60	4 70	4 70	4 70	4 70
1857.....			4 05	4 05	4 15	4 15	4 25	4 25	4 25	4 25
1858.....			3 50	3 50	3 55	3 60	3 70	3 80	3 90	3 90
1859.....			3 50	3 50	3 60	3 65	3 75	3 80	3 90	3 90
1860.....			3 70	3 75	3 80	3 85	3 95	4 05	4 15	4 15
1861.....			3 70	3 75	3 80	3 85	3 90	3 95	4 00	4 00
1862.....			3 15	3 45	4 45	4 75	5 05	5 45	6 35	6 35
1863.....			4 60	5 85	6 60	6 85	6 85	7 60	8 10	8 10
1864.....		8 15	8 65	8 90	9 40	10 90	11 90	11 40	10 40	10 40
1865.....		10 60	7 90	7 15	7 20	7 25	9 25	12 00	12 00	12 00
1866.....		8 00	7 50	7 25	7 25	7 25	7 25	6 75	6 50	6 50
1867.....		5 70	5 70	5 30	Auc'n.	Auc'n.	4 60	4 90	4 90	4 90
1868.....		4 30	4 45	4 50	4 55	4 60	4 90	5 60	5 60	5 60
1869.....	4 90	4 60	5 40	5 50	6 80	8 80	8 10	8 25	8 25	6 35
1870.....		5 25	5 45	5 10	5 10	5 10	5 60	5 60	5 10	4 15
1871.....				6 20	5 20	5 60	5 70	6 00	6 10	6 10
1872.....	4 30	4 10	4 15	3 70	3 70	3 70	3 80	4 10	4 25	4 25
1873.....	5 00	4 90	5 00	5 10	5 20	5 30	5 40	5 50	5 50	5 50

## DELAWARE AND HUDSON CANAL CO.

	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1852.....			3 70	3 70	3 80	3 80	3 90	3 90	3 90	3 90
1853.....			3 85	3 85	3 95	3 95	4 05	4 05	4 05	4 05
1854.....			4 75	4 75	4 85	4 85	4 95	4 95	4 95	4 95
1855.....			5 20	5 20	5 30	5 30	5 40	5 40	5 40	5 40
1856.....			4 70	4 70	4 80	4 80	4 90	4 90	4 90	4 90
1857.....			4 25	4 25	4 25	4 40	4 40	4 55	4 55	4 55
1858.....			3 70	3 70	3 70	3 85	3 85	4 00	4 00	4 00
1859.....			3 60	3 60	3 70	3 70	3 80	3 80	3 90	3 90
1860.....			3 70	3 70	3 85	3 85	4 00	4 00	4 15	4 15
1861.....			3 70	3 70	3 85	3 85	4 00	4 00	4 15	4 15
1862.....			3 55	3 55	3 65	4 70	4 90	4 90	5 00	5 00
1863.....			5 90	6 30	6 50	6 50	7 00	7 85	9 50	9 50
1864.....			8 50	9 00	10 25	12 00	11 50	8 75	9 50	9 50
1865.....			8 00	7 00	7 00	7 00	8 00	10 75	11 75	11 75
1866.....			7 10	7 10	7 50	7 50	7 00	7 00	7 00	7 00
1867.....		5 25	5 25	5 45	5 45	5 65	5 65	5 85	5 85	5 85
1868.....		4 30	4 75	4 75	4 75	4 90	5 50	6 00	8 00	8 00
1869.....	4 90	5 00	5 25	6 00	7 00			8 00	8 00	8 00
1870.....	5 40	5 75	5 50	5 20	5 20	5 50	5 50	5 25	5 10	5 10
1871.....			6 00	6 00	5 75	5 75	5 95	6 25	6 00	5 75
1872.....	4 25	4 25	4 15	3 90	4 00	4 00	4 00	4 60	4 90	5 10
1873.....	5 55	5 00	5 10	5 20	5 30	5 40	5 50	5 60	5 70	5 70

# Monthly Prices of Stove Coal.

## SCHUYLKILL, AT PHILADELPHIA.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
53...	3 45		3 57½	3 37½	3 50	3 55	3 80	3 60	3 70	4 45	4 50	4 70
54...	4 50	4 50	4 18	4 18	4 50	4 95	5 50	5 87	5 87	5 87	5 50	5 50
55...	4 70	5 00	4 25	4 55	4 45	4 25	4 20	4 12	4 50	4 25	4 25	4 25
56...			4 25	4 37	4 15	3 95	4 10	4 10	4 05	4 25	4 25	4 25
57...		4 25	4 00	3 70						4 12	4 00	4 00
58...			3 75	3 60	3 60	3 45	3 45	3 45	3 40	3 45	3 40	3 45
59...		3 50	3 55	3 40	3 40	3 35	3 40	3 40	3 40	3 40	3 45	3 50
60...			3 35	3 35	3 35	3 45	3 50	3 55	3 75	3 75	3 75	
61...				3 40	3 40	3 40	3 50	3 45	3 50	3 40	3 40	
62...	3 45					2 32	3 60	4 80	4 15	4 55	5 32	5 50
63...	5 00	4 60	4 75	4 95	5 10	5 30	6 00	6 15	6 50	7 05	8 50	6 50
64...	7 10	7 00	6 25	6 70	7 00	8 00	9 75	10 40	9 75	9 00	8 30	9 00
65...			9 00	8 50	7 25	6 50	6 00	6 25	8 50	11 50	9 00	7 75
66...			5 50	5 75	5 35	5 60	6 00	6 00	5 75	5 75	5 25	5 00
67...			4 50	4 35	4 30	4 40	4 40	4 00	4 10	4 30	4 25	5 15
68...			4 25	4 00	4 00	4 00	4 00	4 45	5 25	6 25	7 50	6 62
69...	5 50	5 25	4 75	5 00	5 25	Strike.	Strike.	Strike	7 00	6 50	6 50	5 75
70...	5 00	4 75	4 25	4 75	4 75	4 50	4 40	4 60	4 75	4 75	4 30	4 15
71...					5 25	4 85	4 45	4 65	4 85	5 25	4 75	5 50
72...	4 75	3 75	3 90	3 75	3 75	3 75	3 75	3 80	3 90	4 35	4 60	4 60
73...					4 30	4 30	4 40	4 50	4 60	4 70	4 80	4 90

## LEHIGH—AT SHIPPING PORTS.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1...	4 30	4 30	4 25	4 20	4 25	4 20	4 75	4 20	4 25	4 35	4 35	4 50
2...	4 50	4 25	4 35	4 15	4 10	4 10	4 10	4 15	4 15	4 15	4 20	4 20
3...	4 50	4 50	4 00	3 75	3 75	4 25	5 25	5 50	6 00	7 25	7 50	7 25
4...	7 00	6 75	6 50	6 25	6 50	7 00	7 75	7 50	7 75	8 50	9 50	8 50
5...	8 25	8 25	8 25	8 25	9 25	9 50	11 50	12 50	12 25	10 50	10 50	10 50
6...	10 25	10 50	12 25	11 00	8 50	8 00	7 00	8 00	10 25	12 00	12 00	10 75
7...	10 00	9 25	7 50	7 00	7 00	7 50	8 25	8 00	7 50	6 75	6 75	6 75
8...	6 75	6 75	6 00	5 75	5 75	5 75	5 75	5 75	5 50	5 50	5 50	5 50
9...	5 25	5 25	5 50	5 25	5 00	5 00	Strike.	5 50	6 50	7 50	9 00	8 25
10...	7 50	6 50	5 25	5 50	5 50	Strike.	8 00	8 50	7 75	8 25	8 25	6 25
11...	5 25	5 25	5 50	5 50	5 50	5 50	5 50	5 75	5 75	5 75	5 50	5 25
12...							6 00	6 00	6 00	6 50	6 25	5 50
13...	5 25	4 50	4 50	4 50	4 50	4 50	4 50	4 50	4 50	4 80	5 10	5 10
14...	5 10	5 50	5 50	5 20	5 35	5 45	5 55	5 65	5 75	5 85	5 95	5 95

## WAGES IN SCHUYLKILL COUNTY.

FOR 1872 AND 1873.

Prepared for us by B. E. Troutman, Sect'y of A. B. of T.

Average prices of coal at Port Carbon, for each month, from the returns made by the operators; also the rate upon which wages were paid.

Jan. 6th, 1872—Basis agreed—\$2.50 at Port Carbon, with \$2.25 as minimum. Wages to advance 1 per cent, for each 3 cents per ton advance in the price of coal.

Date.	Average Price of Coal.	Wages Paid.
1872 January.....		Basis.
" February.....	2.303-10	"
" March.....	2.2227-100	"
" April.....	2.1414-25	8½ per ct. off.
" May.....	2.0141-100	"
" June.....	2.07½	Basis.
" July.....	1.99	"
" August.....	1.923-10	"
" September.....	2.09	"
" October.....	2.13½	"
" November.....	2.387-10	"
" December.....	2.2929-100	"

Jan. 13th, 1873—"The operators accepted the offer of the men for last years basis, with two dollars and fifty cents (\$2.50) basis as a minimum."

Date.	Average Price of Coal.	Wages Paid.
1873 January.....		Basis.
" February.....	2.634-10	4 ¾ ct. above.
" March.....	2.624-10	4 "
" April.....	2.4927-100	Basis.
" May.....	2.51	"
" June.....	2.5073-100	"
" July.....	2.554-100	2 ¾ ct. above.
" August.....	2.6049-100	3 " "
" September.....	2.6094-100	4 " "
" October.....	2.62	4 " "
" November.....	2.6668-100	5 " "
" December.....	2.7422-100	8 " "

## THE EXPENSES ON BITUMINOUS COAL

In most instances, we have included the expenses in the description of the region, and make the following additions.

Pennsylvania Gas Coal from Irwin or Pen Station to West Philadelphia:—In cars Pennsylvania Railroad Company per 2,000 lbs \$5.00; in compromise (or individual) cars per 2,000 lbs. \$4.00; On Bituminous coal from Osceola, on T. and C. Railroad, to West Philadelphia \$3.61. or 2,000 lbs; to South Amboy \$3.96, less a drawback on shipments north and east.

From Connellsville to Pittsburgh, 2½ cents per bushel, or \$15 per car load.

At the west, the usual rate is 1½ cents per ton, per mile.

## COAL AT PROVIDENCE, R. I.

The receipts of coal at the port of Providence, R. I. during the year 1873, were as below:—

Anth. from N. Y. etc.....	389,982 tons
" " Philadelphia..	125,879
Bituminous of all kinds.....	126,720

Making a total of..... 642,581

Against, in the year 1872... 633,452

## EXPORTS OF COAL.

The amount of Coal reported as cleared from New York, during 1872 and 1873 was as follows:—

For the year 1872.....	89,059 tons
For the year 1873.....	46,510

## COAL IN AUSTRIA.

The amount of Brown coal raised in Austria during the year 1871, was 4,300,526 tons.



## Latest Coal Tonnages.

### PENNSYLVANIA & NEW YORK R. R.

Report of coal carried for year ending Nov. 1873.

Anthracite.....	685,373 15
Bituminous.....	294,868 05
<b>Total.....</b>	<b>980,242 00</b>

Anthracite was received from—

Lehigh Valley Railroad....	485,184 02
Lack. & B. Railroad.....	36,859 19
Pleasant Valley Branch....	128,061 16
Sullivan & Erie Railroad...	35,267 18

Bituminous was received from—

Barclay Railroad.....	294,477 16
Northern Central Railroad.	384 09

Anthracite was delivered to—

Lehigh Valley Railroad....	24,004 13
Lack. & B. Railroad.....	1,443 05
S. Central Railroad.....	155,192 18
Ithaca & Athens Railroad..	145,448 16
Erie Pockets for shipment.	242,383 06
Erie, Watkins direct.....	13,280 10
Individuals on line.....	30,776 10
Used by Company.....	26,027 14
Between Waverly & Elmira.	46,816 03

Bituminous was delivered to—

Erie Railway.....	292,201 12
S. Central Railroad.....	22,557 10
Ithaca and Athens Railroad	548 18
Lehigh Valley Railroad....	1,179 19
Individuals on line.....	1,262 12
Used by company.....	118 04

Business for the year ending November 1872, was as follows:

Anthracite.....	580,937 16
Bituminous.....	337,191 15
<b>Total.....</b>	<b>918,129 11</b>

### PHILADELPHIA AND READING R. R. CO.

Report of coal carried over the Philadelphia, and Reading Railroad, and Branches for the year ending November 29th 1873.

Passing over main line.....	4,137,636 17
For shipment by Schuylkill Canal.	735,047 01
Shipped Westward.....	301,838 00
Shipped West or South.....	107,595 09
Consumed on laterals.....	190,770 12
Lehigh and Wyoming coal.....	407,261 03
Total Anthracite paying freight....	5,880,149 02
Bituminous.....	310,266 15

Total all kinds paying freight... 6,190,415 17

Anthracite for Company's use.....	343,050 04
Bituminous for Company's use....	13,087 07

Total tonnage for the year..... 6,546,553 08

SCHUYLKILL CANAL--

By canal during the year.....	743,796 07
By canal last year.....	838,190 10

The coal was received from the Lateral roads as follows:

At Port Carbon.....	1,742,561 04
At Mount Carbon.....	145,645 16
At Schuylkill Haven.....	1,443,134 10
At Pine Grove.....	366,007 01
At Tamaqua.....	642,972 08
At Harrisburg and Dauphin.....	222,006 03
At Allentown and Alburts.....	8,875 15
At Orelan and Willow Street....	80,081 16
At Summit and Rupert.....	344,259 00
BITUMINOUS, at Harrisburg.....	323,354 02
Coal for Canal.....	735,047 01
Shipped west, via N. C. etc....	301,838 00
Consumed on laterals.....	190,770 12

Total business of the Company. 6,546,553 08

## LEHIGH VALLEY R. R. AND BRANCHES.

Report of coal carried over the Lehigh Valley Railroad and Branches, for the year ending Nov. 29, 1873.

## ANTHRACITE RECEIVED.

From Wyoming region.....	881,628 13
During the previous year.....	508,933 09
From Hazleton.....	2,123,097 17
During the previous year.....	2,192,877 05
From Upper Lehigh.....	2,974 15
During the previous year.....	3,689 19
From Beaver Meadow.....	629,570 18
During the previous year.....	7,656 12
From Mahanoy.....	503,802 02
During the previous year.....	385,970 17
From Mauch Chunk.....	4,265 13
During the previous year.....	2,683 07

Total.....	4,144,339 18
Same time previous year.....	3,850,118 09

Forwarded east by rail from M. C. 3.....	139,023 13
Same time previous year.....	3,093,395 11

## BITUMINOUS.

From P. & N. Y. R. R.....	1,179 19
From all other sources.....	26,845 17

Total Bituminous.....	28,025 16
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Total Anthracite.....	4,144,339 18
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Grand Total.....	4,172,365 14
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The Anthracite carried was distributed as follows:

Local East of Mauch Chunk.....	78,959 09
Forwarded east for L. V. R. R....	51,517 13
Deliv'd to Furnace and Mfg Co's	653,552 02
“ “ Cat. and Fog. R. R....	7,414 08
“ “ East Penn. Railroad....	8,754 06
“ “ North Penn. Railroad....	307,830 01
“ “ Port Delaware.....	206,957 11
“ “ Easton & Amboy R. R....	
“ “ Morris and Essex R. R....	269,651 08
“ “ Bel. Del. Railroad....	1,038,564 05
“ “ Central Railroad.....	515,822 11
Used by Lehigh Valley R. R. Co..	68,159 04

Delivered to P. & N. Y. Railroad.	485,184 02
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Delivered to North'n Central R.R.	24,929 08
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Delivered to D. H. & W. Railroad.	31,453 16
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To L. & S. R. R., at Packerton...	14,222 19
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Delivered at M. C. for Individuals	2,731 18
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Delivered above M. C. ....	16,373 13
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Delivered to L. & S. R. R. (rail)	1,541 10
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To L. & S. R. R. at P. H. (canal)	192,668 14
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To Lehigh Canal at M. C. ....	81,700 15
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To Catawissa Railroad.....	140 00
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To L. & B. R. R. at Lack. Junc..	85,710 05
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Total.....	4,144,339 18
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## PORT RICHMOND, PHILA.

The business at this point during the year ending Nov. 29, 1873, was as below:

## RECEIPTS.

Anthracite.....	2,251,366 14
Bituminous.....	77,562 13

A total of.....	2,328,869 07
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## SHIPMENTS.

Anthracite.....	2,149,824 04
Bituminous.....	77,041 10

A total of.....	2,226,865 14
-----------------	--------------

The following will show the destination of the coal shipped from Port Richmond, Phila., for the year ended on Nov. 29, 1873. Furnished by Thomas M. Richards, Shipping Agent for the company.

States.	Tons.
Nova Scotia.....	1,724
New Brunswick.....	7,771 13
Maine.....	100,633
New Hampshire.....	49,607
Massachusetts.....	997,836 05
Rhode Island.....	142,433 05
Vermont.....	850
Connecticut.....	74,931
New York.....	359,891 10
New Jersey.....	106,201 10
Pennsylvania.....	151,046 00
Delaware.....	8,093
Maryland.....	22,803
District of Columbia.....	101,887
Virginia.....	85,519
North Carolina.....	6,891 10
South Carolina.....	14,402
Georgia.....	10,713 10
Florida.....	7,830
Alabama.....	1,995
Louisiana.....	1,534
Texas.....	3,833 10
Cuba.....	7,617 10
South America.....	421
Sandwich Islands.....	722
California.....	1,205

2,266,892 14

Aggregate production of Anthracite coal in Pennsylvania from 1863 to 1873, with the receipts of coal at Port Richmond.

Total Production.	Rec'ts at Port Richmond.
1863.....	9,566,006
1864.....	10,177,475
1865.....	9,652,391
1866.....	12,703,882
1867.....	12,988,725
1868.....	13,834,132
1869.....	13,723,030
1870.....	15,849,899
1871.....	15,113,407
1872.....	18,928,263
1873. (est.)	20,000,000

## PENNSYLVANIA R. R.—N. J. DIVISION.

The following shows the business of this branch of the Penna. Railroad, furnished us by J. A. Anderson, Supt.

	Through.	Way.	Total
1870	877,614	87,989	965,603
1871	563,003	69,334	632,337
1872	632,667	81,910	714,577
1873	455,184	72,539	527,723
1874	312,228	19,065	331,293
1875	209,733	18,546	228,279
1876	174,503	13,554	188,057
1877	202,731	11,535	214,266
1878	161,268	13,095	174,363
1879			130,494
1880			129,452
1881			145,907
1882			146,348
1883			135,205
1884			90,000
1885			123,248

The business for the year 1873 was as follows:

Port for shipment	325,080
Amboy	472,786
Contribution for consumption	292,529
Of company	71,649

Total 1,159,044

was received from the following sources:

From Lehigh	918,892
From Wyoming	210,153

was actually shipped.

At Coal Port	327,465 06 tons
And at South Amboy	459,774 15 tons.

## BLOSSBURG COAL TRADE.

The following is the quantity of coal sent to market annually up to the present time:

Years.	Blossburg. Tons.	Rail-ston. Tons.
1840	4,285	
1841	25,968	
1842	13,164	
1843	6,248	
1844	14,234	
1845	29,836	
1846	16,509	
1847	29,807	
1848	33,763	
1849	32,095	
1850	23,161	
1851	2,000	
1852	20,000	
1853	45,507	
1854	70,214	
1855	73,204	
1856	70,669	
1857	94,314	
1858	41,844	
1859	48,993	
1860	76,948	
1861	112,712	
1862	179,334	
1863	234,843	
1864	34,977	
1865	294,042	
1866	411,769	
1867	481,318	
1868	602,323	
1869	715,094	
1870	743,035	17,803
1871	815,079	105,133
1872	849,262	171,440
1873	991,057	212,467

## BROAD TOP COAL TRADE.

Report of Coal shipped over the Huntington Broad Top Mountain Railroad:—

Coal shipped for year 1873	473,304
for 1872	318,208

Coal was received from the following

Liberalnd Region	114,589
Broad Top Region	358,715

## THE BARCLAY COAL TRADE.

The following table shows the amount of coal shipped from the Barclay Coal Region, since it was opened; by the several companies which have mined it.

Barclay Coal Co.	Towanda Coal Co.	Fall Creek Coal Co.	Total Producers
2,295			2,295
6,255			6,255
17,560			17,560
30,143			30,143
27,718			27,718
40,835			40,835
52,739			52,739
54,535			54,535
62,058			62,058
4,375	7,846	16,933	73,197
37,903	31,881	29,604	99,453
30,119	27,663	16,933	74,739
	67,080	6,595	73,675
	176,307	4,303	180,610
	195,310	77,025	272,335
	2,9240	129,095	378,345
	263,960	118,882	382,842
	235,220	85,315	320,535

## LEHIGH VALLEY R. R. CO.

Statement showing the coal tonnage of the Lehigh Valley R. R. Co., from the commencement of business.

YEAR.	COAL TONNAGE PAID OF MAUCH CHUNK	TOTAL COAL TONNAGE	GROSS RECEIPTS.	Miles of MAIN ROAD.
1855 (3 mo.)	8,482 16	8,482 16	\$ 17,281 63	46
1856	165,740 00	165,740 00	242,512 61	46
1857	413,235 03	413,235 03	441,187 43	46
1858	471,029 10	471,029 10	442,045 35	46
1859	577,651 10	577,651 10	545,866 43	46
1860	730,641 17	730,641 17	679,908 59	46
1861	743,671 18	743,671 18	679,491 30	46
1862	882,573 14	882,573 14	856,054 53	46
1863	1,193,154 18	1,193,154 18	1,370,045 80	46
1864	1,295,419 02	1,466,794 02	2,411,917 69	87
1865	1,402,276 16	1,687,462 00	3,238,837 06	87
1866	1,730,474 12	2,037,714 07	3,711,574 73	127
1867	1,948,385 05	2,080,156 16	3,641,136 03	158
1868	2,225,630 02	2,603,102 11	4,270,649 70	169
1869	2,015,296 11	2,310,170 03	4,925,061 06	169
1870	2,810,020 07	3,648,586 13	5,938,167 43	194
1871	2,210,272 05	2,889,074 03	5,290,724 65	202
1872	3,009,395 11	3,850,118 09	5,982,949 48	202
1873	3,189,023 13	4,144,339 18	.....	202



## EXPORT COAL TRADE OF GREAT BRITAIN.

The following are the exports of coal, from Great Britain, for the years 1871 and 1872: and for the first eleven months of 1873.

	1871.	1872	1873
Russia.....	914,432	796,055	610,235
Sweden.....	397,950	507,662	718,349
Denmark.....	658,707	643,881	521,455
Germany.....	2,396,812	2,115,128	1,551,151
Holland.....	506,470	472,002	433,620
France.....	2,006,152	2,191,340	2,206,477
Spain.....	596,952	635,695	540,195
Italy.....	826,059	926,453	739,561
Brazil.....	329,307	312,864	345,758
British India.	594,226	553,748	484,831
Other places..	3,520,920	4,060,133	3,407,818
Total tons...	12,747,989	13,211,961	11,559,450

## THE WILKESBARRE COAL & IRON CO.

This Company is fast growing toward the front rank of producers of coal in the Wyoming valley. The business during the past five years has been as below:

	Tons.
1869.....	502,485
1870.....	769,226
1871.....	90,754
1872.....	1,108,716
1873.....	

The details of the business for 1873 are as follows:

Total shipments for the year.....	1,278,407.08
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### SHIPPED AS FOLLOWS:

By Railroad.....	1,255,023.16
By Canal.....	23,383.12
Total.....	1,278,407.08

## LEHIGH COAL AND NAVIGATION CO.

Table showing the production of this Company from its origin:

Tons.	Tons.
1820.....	365
1821.....	1,073
1822.....	2,440
1823.....	5,823
1824.....	9,541
1825.....	28,393
1826.....	31,230
1827.....	27,770
1828.....	33,150
1829.....	25,110
1830.....	43,000
1831.....	41,500
1832.....	77,292
1833.....	124,508
1834.....	106,500
1835.....	131,250
1836.....	146,738
1837.....	200,000
1838.....	154,693
1839.....	142,507
1840.....	102,264
1841.....	78,164
1842.....	163,762
1843.....	138,866
1844.....	219,245
1845.....	257,740
1846.....	234,813
1847.....	351,675
1848.....	360,619
1849.....	393,807
1850.....	424,253
1851.....	480,824
1852.....	510,406
1853.....	496,905
1854.....	544,811
1855.....	449,812
1856.....	400,425
1857.....	400,751
1858.....	425,891
1859.....	546,816
1860.....	517,157
1861.....	410,877
1862.....	241,837
1863.....	517,259
1864.....	517,180
1865.....	517,025
1866.....	400,000
1867.....	370,204
1868.....	453,821
1869.....	563,914
1870.....	468,272
1871.....	762,682
1872.....	1,014,890

## L. AND S. BRANCH OF CENTRAL R. R. OF N.

Report of coal received for the year ending Dec. 31, 1873.

Where from	Year.
Wyoming Region.....	1 812 020
Upper Lehigh Region.....	200 381
Bv. Meadow Region.....	346 752
Hazleton Region.....	207 723
Mauch Chunk Region.....	522 820
Totals.....	3 089 697

Distributed as: follows—

Forw'd East by rail Tidal points..	1 488 457
“ “ “ Local “..	470 653
“ “ “ use Cent. Div.	91 620
“ “ “ “ L. & S....	12 148
At Coalport for canal.....	667 759
At and above Mauch Chunk.....	85 591
To L. V. R. R. at Packerton.....	25 053
To L. V. R. R. at Sugar Notch...	107 409
To L. & B. R. R. at Plymouth...	141 004

Total.....3 089 697

For previous year.....2 527 068

## CENTRAL RAILROAD OF NEW JERSEY.

The following is the quantity of coal transported over this road; furnished by P. H. Wyckoff, Esq. G. F. A.

Years	Lehigh.	Scranton.	To
1856.....	33,325	98,670	131,995
1857.....	84,881	209,950	294,831
1858.....	122,923	417,726	540,649
1859.....	180,054	461,430	641,484
1860.....	263,885	590,862	854,747
1861.....	254,367	568,869	823,236
1862.....	311,296	502,375	813,671
1863.....	435,729	613,954	1,049,683
1864.....	474,221	675,743	1,149,964
1865.....	509,619	494,687	1,004,306
1866.....	511,076	779,173	1,290,249
1867.....	513,383	854,520	1,367,903
1868.....	765,657	853,189	1,618,846
1869.....	733,495	822,567	1,556,062
1870.....	997,504	1,054,680	2,052,184
1871.....	1,244,998	632,066	1,877,064
1872.....	1,533,590	689,626	2,223,216

The business for the year 1873 was as below:  
To Port Johnston.....1,348,694 08 to  
“ Elizabethport.....948,252 07  
“ Way Stations.....169,133 00

Total.....2,466,079.03

## THE SHAMOKIN COAL TRADE

Report of coals sent over Northern Central R. for week ending Dec. 31, 1873..... 4 962 0  
Same time last year..... 3 232 0  
Total amount shipped to date.....635 384  
To same time last year.....569 689

## CUMBERLAND COAL TRADE.

Through the courtesy of C. SLACK Esq, we are enabled to give the official figures of the business of this region.

The Production and Shipments of each Company for year ending Dec. 31, 1873:

Virginia C. & I. Co.....	77,582,00
Aden Mining Co.....	178,459,18
Consolidation.....	548,484,00
Wampshire and Baltimore.....	197,927,00
Large's Creek C. & I.....	302,264,00
W Central Coal.....	285,145,19
Maryland Coal.....	304,123,15
American Coal.....	265,549,08
Atlantic & G. C.....	115,071,00
Edmont.....	67,829,00
Antanton.....	54,493,00
Tomac.....	80,150,00
George's Creek Mining Co.....	72,150,18
Franklin.....	110,981,12
W Reading.....	1,337,02
Wen Avon Co.....	12,552,00
	<u>2,674,101,00</u>

## Recapitulation of Distribution --

C. & P. R. R. to B. & O. R.R.....	1,478,733
" " to C. & O. Canal.....	641,220
" " to Penn. Railroad.....	114,589
" " Local.....	30,837
Cumb. Branch road to B. & O. R.R.....	85,446
" " to C. & O. Canal.....	137,582
" " Local.....	4 319
H. & B. Co., to B. & O. R. R.....	103,710
" " Local.....	83
Virginia C. & I. Co.,.....	77,540
" " Local.....	42

Total ton in 1873. 2,674,101

16,293 tons of Gas coal shipped by canal during the year.

333,105 ton used by the B. and O. Railroad during the year.

## COAL TRADE OF ST. LOUIS.

The receipts of coal at St. Louis, Mo., during the year 1873, were as below:

	Bushels.
St. Louis & Southern Railroad.....	9,240,146
St. Louis & Missouri Railroad.....	4,530,872
St. Louis & South-eastern.....	2,824,389
St. Louis & St. Louis Railroad.....	4,024,390
St. Louis & Vandalia Railroad.....	3,886,000
St. Louis & Muddy via Cairo & St. Louis R. R.....	237,800
St. Louis coal.....	1,500,000
St. Louis & Muddy via River.....	1,620,000

## COAL AT BOSTON, MASS.

The receipts of foreign and domestic coal at this port have been as follows:

	Foreign, tons.	Domestic, tons.
1873.....	87,700	1,076,673
1872.....	90,739	1,068,781
1871.....	109,013	822,808
1870.....	115,022	819,890
1869.....	110,469	764,017
1868.....	103,901	742,481
1867.....	117,440	680,221
1866.....	159,380	676,376
1865.....	209,225	538,917
1864.....	188,786	516,666
1863.....	180,445	589,921

The details of the receipts of coal at Boston for year ending Dec. 31, 1873, are as below:

From	1873.
Alexandria, Va.....	82,847
Georgetown, D. C.....	22,682
Philadelphia, Pa.....	536,958
Baltimore, Md.....	236,791
Other places, (N. Y. etc.).....	197,395
Great Britain.....	4,597
Nova Scotia.....	83,103

Total for the year.....1,164,373

These figures include all the coal coming to the Port, both for the home trade, and for the points reached by the railroads centering here.

The coal entered for the city alone during 1873, was received from:

Alexandria, Va.....	38,707
Georgetown, D. C.....	26,114
Philadelphia.....	206,552
Baltimore.....	39,699
Other places in the U. S.....	82,041
Great Britain.....	3,531
Nova Scotia.....	32,080

Total in tons.....428,724

These figures are furnished us by the Collector of Customs, THOMAS RUSSELL, Esq.

The Boston SHIPPING LIST gives the following as the highest and lowest prices of Anthracite and Provincial Coal for ten years past at that point:

	Anthracite, per ton.	Nova Scotia. p r ton.
1873.....	\$8 00 @ 10 00	\$7 00 @ 9 00
1872.....	7 00 @ 10 00	6 00 @ 8 50
1871.....	7 00 @ 10 00	5 75 @ 7 00
1870.....	7 00 @ 11 00	5 75 @ 7 25
1869.....	7 50 @ 11 00	7 25 @ 9 00
1868.....	7 00 @ 12 00	7 50 @ 9 00
1867.....	7 50 @ 10 00	7 25 @ 9 25
1866.....	9 00 @ 15 00	7 50 @ 9 50
1865.....	8 75 @ 17 00	6 25 @ 18 00
1864.....	11 00 @ 16 00	8 00 @ 14 00

## BROAD TOP SEMI-BITUMINOUS COAL TRADE.

Statement exhibiting the amount of coal mined and sent to market in 1873, from the collieries of the Broad Top Semi-Bituminous Coal Region, with present facilities and estimated capacity for 1874, furnished by John Fulton, Mining Engineer.

Name of Colliery.	Name of Proprietor.	Name of Operator.	Tons net, sent to Market in 1873.	Miners.	Other Workmen	Houses.	Capacity per day.	Value of improve- ments.
Coalmont,	Chandler and Peabody.	John Whitehead & Co.	10,392½	23	3	11	40	\$80,000.
Cumberland,	H. & B. T. R. R. Co.	Do.	8,909½	6	2	5	80	12,000
Crawford,	Do.	Do.	7,084½	..	2	8	30	15,000
Powelton,	Powelton Coal & I. Co.	Berwind & Bradley.	48,676½	95	30	50	280	150,000
Barnet Plane,	Do. Do.	Do. Do.	7,084½	..	..	..	..	30,000
Barnett,	Orbison, Dorris & Co.	R. U. Jacobs & Co.	33,303½	56	13	10	150	30,000
Dudley Slope,	Wood & Bacon.	J. M. Bacon.	4,164½	22	6	23	65	30,000
Blairs,	David Blair.	Do.	25,967½	37	10	13	130	20,000
Howe,	Do.	Do.	9,139	14	1	..	50	5,000
Union,	J. Hartman.	Do.	..	..	..	14	30	20,000
Broad Top,	Semi-Anthracite C. Co.	J. F. Mears.	239	..	..	..	..	3,000
Mooredale,	Do.	Reakirt, Bro. & Co.	29,046½	40	5	36	150	20,000
Fishers	Fisher & Miller.	Fishers & Miller.	24,243	50	6	17	150	25,000
Carbon,	Rathmell Wilson.	J. F. Mears.	19,877½	53	6	5	150	25,000
Cook,	B. Top Improvement Co.	P. Ammerman.	4,356	16	3	27	50	20,000
Mount Equity,	Riddelsburg C. & I. Co.	Kemble C. & I. Co.	11,781½	35	8	17	120	30,000
Davall Shaft,	Rathmell Wilson.	Do.	42,220	..	..	37	100	50,000
Cunard,	R. B. Wigton.	R. B. Wigton.	23,259½	46	9	31	200	50,000
Mount Eagle,	Reed, Wilson & Co.	W. H. Piper.	22,208	51	10	14	130	20,000
Scott Shaft,	Hon. John Scott.	William Scott.	12,986½	20	4	10	100	45,000
Edge Hill,	Rathmell Wilson.	Dr. Jenkins.	2,741½	23	3	23	200	40,000
Delaware,	Do.	Do.	..	..	..	..	80	15,000
Alexis,	Six Mile Run Coal Co.	Andrew Gleason.	9,114½	25	3	15	100	40,000
Total.....			350,245½	632	122	367	2,585	\$775,000

## CENTRAL RAILROAD OF NEW JERSEY.

Statement showing the tonnage of coal transported over the Central Railroad of N. J., during the year 1873.

Consigned as follows:

Port Johnston .....	1,348,694 08
Elizabethport .....	948,252 00
Way stations .....	169,133 00

Total ..... 2,466,079 08

That for Port Johnston was consigned to the following parties:

Wilkesbarre C. and I. Co.	916,761 04
Lehigh Coal and Nav. Co.	171,813 19
A. Pardee & Co.	158,617 06
Caldwell, Weston & Co.	46,183 11
Heilner & Son	34,627 17
D. Duncan	20,043 17
B. & L. Railroad	656 14

That to Elizabethport was consigned to the following parties:

D. L. & W. Railroad	471,493 05
Honey Brook Coal Co.	161,998 01
Lehigh Coal and Nav. Co.	71,354 18
G. B. Linderman & Co.	52,102 05
Walter, Donaldson & Co.	51,801 18
Hurd & Dean	48,862 04
Samuel Bonnell, Jr.	31,602 04
A. L. Mumper & Co.	24,221 17
Day, Huddell & Co.	18,415 10
J. Q. Sloan	8,492 04
R. Rommell, Jr. & Bro.	3,850 06
Butler & Drake	2,626 07
Randolph Bros.	1,431 01

## LACKAWANNA COAL TRADE.

Delaware, Lackawanna and Western Railroad.

Report of coal tonnage for the year ending Dec. 31, 1873.

	Year.
Shipped North .....	986,619 0
“ South .....	2,149,737 0
Total .....	3,136,298 1
Same time 1872 .....	2,840,585 0

Delaware and Hudson Canal Company.

Report of coal mined for year ending Dec 31, 1873.

	Year.
Forwarded North .....	2,532,176 0
“ South .....	170,419 1
Total .....	2,752,595 1
Same time 1872 .....	2,930,767 0

The coal mined by the Delaware and Hudson Canal Co. to Dec. 31, was distributed as follows

By Delaware and Hudson canal	1,358,65
Railroad East	433,80
“ West	574,46
“ South	170,42
Total this year	2,537,34
To same period last year	2,725,10

Pennsylvania Coal Company.

Report of coal mined for the year ending Dec. 31, 1873.

Total .....	1,239,214 0
Same time 1872 .....	1,213,478 0



### BLOSSBURG, MC INTYRE AND TOWANDA.

Semi-Bituminous Coal sent to market from the Blossburg, McIntyre and Towanda Regions in 1873.

	Companies	Counties
Fall Brook Coal Co. ....	312,466	
Morris Run.....	357,384	
Blossburg.....	321,207	
Total Tioga Co., Pa.....		991,057
McIntyre Coal Co.....	212,462	
Total Lycoming Co., Pa.		212,462
Towanda Coal Co.,.....	252,329	
Fall Creek B. C. Co.....	85,315	
Total of Bradford Co. Pa.		337,644
	1,541,163	1,541,163

As compared with the production of 1872, Tioga Co. has increased 141,695 tons, Lycoming County has increased 41,035 tons, and Bradford County has decreased 33,567 tons.

### RECEIPTS AT SAN FRANCISCO.

The receipts of coal at San Francisco, California; for the year 1873, were as below:

	TONS.
Anthracite,.....	18,296
Australian.....	97,435
Coos Bay.....	37,898
Cumberland.....	8,857
English.....	52,614
Seattle.....	13,572
Vancouver Isl'd.....	31,435
Rocky Mountain.....	1,904
Mt. Diablo.....	157,388
Bellingham Bay.....	21,210
Chili.....	400
Japanese.....	50

### COAL IN AUSTRIA.

Product for the year 1871—7,657,444 tons, of all kinds.

### COAL IN RUSSIA.

Product for the year 1871—817,000 tons.

### MORRIS AND ESSEX RAILROAD.

The following is the business of this branch of the D. L. & W. R. R. Co.:

	Way.	Through.	Total.
1867.....	99,559	133,662	243,221
1868.....	146,820	300,219	447,039
1869.....	192,217	360,066	552,283
1870.....	191,209	655,292	846,500
1871.....	202,052	654,954	856,006
1872.....	137,703	794,648	932,351
1873.....	313,414	1,352,384	1,665,798

### RECEIPTS OF ALL KINDS OF COAL IN CHICAGO FROM 1852 to 1874

Years.	By Lake.	By Rail.	By Canal.	Total tons.
1852.....				46,233
1853.....				38,548
1854.....				56,774
1855.....				109,576
1856.....				93,020
1857.....				171,379
1858... 76,571	10,719	3,364		87,290
1859... 111,506	11,766	7,932		131,204
1860... 117,646	6,218	7,216		131,060
1861... 168,879	2,407	12,803		184,089
1862... 195,099	7,681	15,643		218,423
1863... 244,624	12,066	27,506		284,196
1864... 251,038	43,991	28,246		323,275
1865... 288,771	41,023	15,060		344,854
1866... 385,906	86,675	23,612		496,193
1867... 391,313	140,319	14,576		546,208
1868... 450,137	197,152	10,945		658,243
1869... 510,876	279,798	8,326		799,000
1870... 522,580	364,894			887,474
1871... 515,253	562,043	4,176		1,081,472
1872... 586,585	804,226	7,213		1,398,024
1873... 737,944	846,943	17,118		1,602,005

### TOTAL SHIPMENTS OF ALL KINDS FROM CHICAGO, ILL.

Years.	By Lake.	By Rail.	By Canal.	Total tons
1852.....				1,441
1853.....				2,998
1854.....				5,048
1855.....				12,153
1856.....				16,161
1857.....				23,942
1858.....				15,641
1859... 153	18,411	1,317		19,886
1860... 17	19,777	570		20,364
1861... 1	19,304	788		20,093
1862... 1,525	3,676	7,716		12,917
1863... 1	13,816	1,429		15,245
1864... 1	15,291	1,488		16,779
1865... 1	21,256	2,934		24,190
1866... 724	29,122	4,344		34,190
1867... 628	66,289	2,253		69,170
1868... 1,196	80,541	1,662		83,399
1869... 1,034	92,373	2,213		95,620
1870... 401	107,483	2,583		110,467
1871... 1	93,943	2,890		96,833
1872... 731	172,480	4,468		177,687
1873... 731	220,853	10,581		232,165

Receipts of Anthracite by Lake, 1870... 340,730  
 " " " 1872... 495,765  
 " " " 1873... 538,837

Receipts of Bituminous by Lake, 1870... 181,850  
 " " " 1872... 90,820  
 " " " 1873... 199,107

No Anthracite received except by Lake, with the exception of 1872, when about 15,000 tons of the rail receipts were Anthracite.

The Custom House records for the year 1871 were destroyed at the great fire.

## PITTSBURGH, PENNA.,

Situated as it is, in the midst of a coal producing country, and having so many connections by rail and water, with coal and iron deposits, this city has taken a high position among the industrial centres of the United States.

The amount of business that is done here each year in coal and coke, now amounts to upwards of one hundred and sixty million bushels including the amount sent to other points. The trade is constantly and rapidly growing. The amount of Bituminous coal shipped over the western end of the Pennsylvania road in 1872 was 17,770,104 bushels, and of coke 12,900,000 bushels. The bulk of the coal went east, while the coke went west. Twenty-five years ago the annual production, including home consumption, amounted to about 4,500,000 bushels.

The receipts of coal via the Pittsburgh, Cincinnati, and St. Louis railroad, may be put at ten million bushels annually. There are some twenty million bushels of coal, and twenty million bushels of coke received by the Connellsville route.

The business of the Monongahela slack-water navigation in 1873, amounted to 55,113,495 bushels of coal, and 3,163,500 bushels of coke. During last year there was quite a business done in Anthracite coal; the strike among the miners in the neighborhood, making prices for Bituminous very high. For tonnages of the roads centering here, and prices, and qualities of coal dealt in, see other portions of this work.

The amount of coal and coke received during 1870-71-72, was as follows:

	Bushels.
1871 Coal.....	67,388,725
“ Coke.....	11,594,000
1871 Coal.....	96,785,635
“ Coke.....	23,357,400
1872 Coal.....	115,065,146
“ Coke.....	43,927,765

The coal was received by the following routes.

1870 By River.....	44,260,000
“ By Rail.....	23,128,725
1871 By River.....	50,864,600
“ By Rail.....	45,921,035
1872 By River.....	57,708,800
“ By Rail.....	57,356,346

The rapid growth of the coke trade of Pitts-

burgh and its vicinity is a most significant illustration of our industrial development. Of this trade, what is known as Connellsville coke forms a large part and will continue to do so.

The following table shows the quantity of bituminous coal shipped out of the Monongahela river since 1844:

Year.	Bushels.	Year.	Bushels.
1844.....	737,150	1859....	28,286,600
1845.....	4,605,185	1860.....	37,947,700
1846....	7,778,911	1861.....	20,865,700
1847.....	9,645,127	1862.....	18,588,900
1848....	9,819,361	1863....	26,444,200
1849....	9,708,507	1864.....	35,070,900
1850....	12,297,967	1865.....	39,522,700
1851....	12,521,228	1866.....	42,615,300
1852....	14,630,841	1867....	30,072,700
1853....	15,716,367	1868....	45,301,000
1854....	17,331,946	1869.....	52,512,600
1855....	22,234,009	1870.....	57,596,400
1856....	8,584,095	1871.....	48,621,300
1857....	28,973,596	1872....	54,508,800
1858....	25,696,669	1873....	55,113,495
Total.....	793,044,596		

An analysis made of a sample of Connellsville coke, average of forty-nine pieces, shows

Moisture.....	490
Ash.....	11,332
Sulphur.....	693
Phosphoric acid.....	029
Carbon.....	87,456

100,000

The ash of the coke contained 47 per cent of Silica, and 47 per cent. Alumina.

## COAL IN NOVA SCOTIA.

The Government reports have not come to hand, but we are enabled to give the following partial statement of production.

## PICTOU COUNTY FOR 1873

Albion Company.....	70,430
Acadia Co.....	54,207
Nova Scotia Co.....	73,362
Inter-Colonial Co.....	22,710

220,709

## CAPE BRETON COUNTY.

	1872.	1873.
Sydney (Old Mines).....	98,328	101,700
International.....	20,498	70,000
Glasgow and Cape Breton..	30,548	60,000
Victoria.....	19,422	11,000
Gardner.....		5,670
Lingan.....	88,504	30,000
Glace Bay.....	30,000	66,000
Port Caledonia.....	52,000	74,000
Block House.....	45,000	44,000
Gowrie.....	46,702	53,000

381,002 517,370

## COMPARATIVE COAL PRODUCTION.

## WYOMING REGION.

Pennsylvania Canal Co..	321,311	290,710
Pennsylvania Coal Co..	1,213,478	1,239,214
L. & W. Railroad..	2,840,585	3,136,298
& H. Canal Co....	2,516,565	2,582,176
& B. Railroad.....	296,445	257,573
Lehigh.....	2,006,424	2,693,548

Credit to this region 9,194,808 10,199,517

## SCHUYLKILL REGION.

Lehigh Valley Railroad.....	4,092,540	4,137,636
Schuylkill Canal.....	838,191	743,796
Lehigh.....	370,215	503,802

5,300,946 5,385,234

Shamokin coal re-ported twice..... 194,495 217,740  
Credit to this region. 5,106,451 5,167,494

## LEHIGH REGION.

Lehigh Valley Railroad.	3,492,608	3,640,537
& S. R. R.....	1,727,611	2,062,878
Lehigh Canal.....	767,094	736,251

5,987,313 6,439,666

Wyoming & Schuyl-kill reported twice .. 2,376,639 3,197,450  
Credit to this region 3,610,674 3,242,216

Shamokin.....	569,689	635,384
Lehigh Valley.....	450,328	446,139

## BITUMINOUS.

Ad Top.....	297,473	350,245
Overland.....	2,355,471	2,674,101
Reported.....	490,631	456,015
Lehigh, Railroad East..	2,067,524	2,200,000

Estimated consumption of Anthracite, in the  
tons 3,500,000 tons annually.

Estimated production of Bituminous coal, in  
United States, other than that mentioned  
above, seventeen million tons.

We have estimated the tonnage via the Penn-  
sylvania Railroad eastward, as up to the last  
agent, the figures had not been received.

## MORRIS CANAL.

The following is a statement of the business of  
the Morris Canal since 1845, furnished by J. F.  
Randolph, Supt. This canal is now leased and  
operated by the Lehigh Valley Railroad Co.

	Lehigh	Scranton	Total.
1845.....	12,567		12,567
1846.....	41,142		41,156
1847.....	61,951		61,958
1848.....	82,159		82,139
1849.....	103,432		103,428
1850.....	98,100		98,100
1851.....	137,237		137,237
1852.....	180,189		180,189
1853.....	222,582		222,582
1854.....	267,864		267,864
1855.....	290,730		290,730
1856.....	285,636	17,784	303,400
1857.....	240,699	43,599	284,298
1858.....	287,299	55,426	342,725
1859.....	261,185	89,146	350,331
1860.....	276,947	127,517	404,464
1861.....	274,017	140,922	414,939
1862.....	152,169	172,128	324,297
1863.....	256,631	145,815	402,446
1864.....	231,745	151,112	382,856
1865.....	291,934	124,204	416,139
1866.....	318,141	141,034	459,175
1867.....	278,472	146,359	424,831
1868.....	268,809	78,736	347,545
1869.....	213,291	67,896	281,187
1870.....	275,458	34,385	309,843
1871.....	246,260	69,350	315,610
1872.....	271,591	70,392	341,983

The business for the year 1873 was as follows:

Lehigh Coal from Lehigh Canal .....	31,188 tons.
Lehigh Coal from L. V. R. R. ....	212,434 tons.
Scranton Coal from D. L. & W. R. R. at Port Washington.....	55,592 tons.
About 50 per cent. of the above came through to tide- water.	

## CLEARFIELD COAL TRADE.

Shipments of Clearfield coal over the Tyrone  
Division of the Pennsylvania Railroad for the year  
1873, amounted to 612,036 tons. The product pre-  
vious to this year was as below:

1862 to 1869 .....	696,377
1870.....	406,523
1871.....	542,896
1872.....	631,915
1873.....	612,036



## VIRGINIA COAL.

The Virginia coal field is said to extend about thirty miles from north to south, and its greatest breadth is about eight miles from east to west. Unlike the three great carboniferous series, this basin rests on granite, the irregularity of the upper surface of which has produced similar irregularities in the lay of the various seams of coal. Two anticlinal axis are believed to extend longitudinally from the southern part of the basin to near the James River, where they are cut off by a cross upheaval, south of which the thick coal seam is worked; and on the north side of the James River this seam is evidently split up into several seams of workable thickness. Of the central portion of the basin, there has been but few explorations, and little is known of it. On the Western outcrop the seams are steeper, more irregular and uncertain than on the eastern outcrop, where as far as they have been opened up the seams have been found to dip with favorable regularity at an angle of about 30 degrees. The coal seams on the north side of the James River are as follows:

1st. Carbonite, or natural coke, varying from 2.6 to 6 feet in thickness.

2d. 30 to 50 feet below the first. A seam of Bituminous coal from 5 to 6 feet in thickness.

3d. 12 to 20 feet below the second. A seam of Bituminous coal, measuring  $4\frac{1}{2}$  feet in thickness.

4th. 40 feet below the third. A seam of Bituminous coal from 5 to 8 feet in thickness.

The out crop of a seam of Bituminous coal  $5\frac{1}{2}$  feet thick has recently been found about eight feet below the fourth seam.

South of the James River we find the following seams.

1st. 5 feet of Bituminous coal; not worked

2d. 4 feet of Bituminous coal; not worked.

3d. A Bituminous coal seam, varying from 20 feet at Cloverhill to 40 feet thick at Midlothian.

The James River Coal Co. who have an

office at 111 Broadway, own and lease upwards of 3,000 acres of land, part of which is underlain with the carbonite, the other being underlain with the rich fatty caking Bituminous coals. The veins of coal on their estate have been traced for upwards of two miles, and range in thickness from  $4\frac{1}{2}$  feet up to 7 feet. The company own their own railway from the mines to the James River & Kanawha Canal, or the Richmond & Potomac Railroad, four and a half miles. From this point to Richmond the distance is twelve miles.

At Richmond this fuel is known as "soft coke," and is used for domestic and manufacturing purposes. The Architectural Iron Works claim that it serves all the purposes of Anthracite coal. It is sold by the cart load of 25 bushels for \$6.50, which is equal to about \$8 per ton.

Dr. Wallace, of Glasgow, in a report made last spring, gives its heating power as 11.04, while Johnson's report gives but 9.48 for the average of the best Anthracite coal. It contains 95.87 of volatile matter, while Anthracite has but 93.14.

The freight from Richmond to New York will vary from \$2.00 to \$2.50, but when a constant business is done vessels can, no doubt, be had regularly at \$2.00 per ton. Under these circumstances the company can afford to deliver the coal at New York for \$7.00 per ton and the carbonite at \$10.00 per ton by the cargo.

The mining in this district has been carried on in a very primitive manner, but now that northern capital and energy has taken hold of this coal field, we may expect a largely increased business to be done. Indeed, the engineer of the James River Coal Company, Mr. Torrey, thinks their product will be about 100,000 tons annually within a short space of time.

A great advantage which the coals here produced have over other coal of a similar nature, is the short distance from a tide-water shipping point and the fact that shipments can be kept up all the year round.

## KITTANING COAL.

Our Bituminous coals as rapid steam generators are every day gaining favor among steam-vessel owners and manufacturers, and it is very gratifying that such is the case. Shipments to South America and the West Indies are now of frequent occurrence, while many of our ocean craft that formerly used English soft coals and American hard coals are adopting our Cumberland and Kittaning coals.

As in the introduction of everything new—and the use of bituminous coals was in a great measure new to most of the Northern steam-users and factories—intense opposition was at first met, Bituminous coals were condemned as being inferior steam-makers; they were objected to as being dirty and smoky, converting every city in which they were used into a second London or Pittsburgh; and more than all, the supply in the Northern market was fluctuating and uncertain. At last, however, we have seen our advocacy of bituminous coals triumphantly justified; they have been proved to excel the common and quite equal the very best varieties of anthracite in their heating power; when properly used, they give rise to little or no offensive smoke and under the judicious management of the larger companies, the market supply is more regular and the prices less fluctuating than those of anthracite.

The steamship *Vaderland* of the Red Star Line, of Philadelphia, is now regularly supplied with the Kittaning coal, and we have the testimony of the Chief Engineer, J. J. DeKinder, to the effect that it is equal to the best English coal he has ever used.

Such being the results reached by a practical test of this coal, a comparison between its constituents and those of the best English coal becomes a matter of deep interest. According to an analysis made by the well-known chemist, Prof. Charles A. Seeley, the composition of coal from the Excelsior vein, the property of the Kittaning Company, is as follows:

Volatile combustible matter.....	20 10
Fixed carbon.....	76 39
Ash.....	3 51

while the constituents of Newcastle coal (English) are:

Volatile combustible matter.....	33 557
Fixed carbon.....	61 700
Ash.....	3 750
Moisture.....	993

## MARYLAND.

### THE GEORGE'S CREEK CUMBERLAND COAL REGION.

#### *A description of the property of the New Central Coal Co.*

The Cumberland Coal, so favorably and well known, and which is proven by experiments at the U. S. Arsenal at Springfield, and by eminent analysts and geologists, to be the best steam raising fuel yet found in this country, is worthy of more than passing mention, and the corporation engaged in mining in this region has truly a valuable property.

The lands and mines of this Company are situated at the centre and in the richest part of the semi-bituminous coal fields of Western Maryland, on George's Creek, and lie between the property of the American Coal Company and the George's Creek Coal and Iron Company on the one side, and the Maryland and George's Creek Companies mines on the other side. The extent of land owned by this company, is stated to be 3,465 acres, the larger part of which is underlaid by the celebrated 14 feet vein, and other smaller veins which eventually will be of great value.

The reputation of the 14 feet George's Creek vein of Cumberland coal is now fully established, and it is conceded to be unequalled for steam-generating purposes. It is supplied, by this and other companies whose mines are in the same coal basin, to every European and Coastwise Steamer which leaves this port, to almost every Railroad, not only in New York, but through the Eastern, Middle, and some of the Southern States. It is burned upon most of the Ferry Boats, and a great number of the Factories, Foundries, Glass Works, &c., in New England and New York. Its superiority for all these various purposes of manufacture and commerce is so generally conceded that the demand is steadily increasing.

The coal basin in which this special coal is found is confined to narrow limits, and the demand is therefore continually tending to be in excess of the production, the value of all the property in the region must advance steadily.

This company was chartered by the State of Maryland, on the 20th of February 1872, and has already made such rapid strides, that its production is now the second of the companies engaged in the mining of coal in this region. The property which this company absorbed on its formation, being those heretofore known as the Big Vein Co's, the Lincoln Coal Co., Midlothian and Koontz. The tonnage done by this company in 1872, including 304,189 tons mined, and 35,886 tons purchased, was 340,075 tons.

See a more complete description of the Cumberland George's Creek Region in another portion of this work.



## AN IMPORTANT ENTERPRISE.

A BRIEF ACCOUNT OF THE PROPERTIES OF THE  
LEHIGH AND WILKESBARRE COAL CO.

The Honey Brook Coal Co., absorbed the Wilkesbarre Coal and Iron Co., together with the property of the Lehigh Coal and Navigation Co., at Plymouth, also the Lehigh Co's. property at Summit Hill, Room Run, and Greenwood, and the Hanover property.

The Lehigh Coal Mine Company, the father of the L. C. & N. Co., was formed in 1793, and "took up" under warrants from the commonwealth of Pennsylvania, 10,000 acres of coal land. After many fruitless attempts to get coal to market by the Lehigh river, they abandoned the experiment, suffering their property to remain idle for some years. In 1813, they leased their land for 10 years to Miner, Cist & Robinson, in consideration of the annual introduction into market of 10,000 bushels of coal, for the benefit of the lessee. Five arks of coal were sent from Mauch Chunk to Philadelphia; two only arrived, the others being wrecked in their passage. Four dollars per ton were paid to haul the coal from mines to Mauch Chunk.

The coal which arrived at Philadelphia, was sold at \$21 per ton; which price not remunerating the owners, they were compelled to abandon the lease. In 1817, Messrs. Josiah White, Geo. F. A. Hauto, and Erskin Hazard leased the property for 20 years. On condition that after a given time for preparation, they should deliver at least 40,000 bushels of coal annually in Philadelphia, paying therefor, one ear of corn as an annual rent. Having the lease, they applied to the Legislature for an act to allow them to improve the navigation of the Lehigh river, which was granted in March 1818; in August, the Lehigh Navigation Co., was formed. In October of 1818, the Lehigh Coal Co. was formed to make a road from the river to the mines. From 1818 to 1820, the companies were engaged in improving the navigation of the river, and building a railroad to the mines. In April 1820, the two companies united their interests, under the title of the Lehigh Navigation and Coal Co., and they sent to Philadelphia 365 tons of coal,

which quantity completely stocked the market and was with difficulty disposed of in 1820. In 1821, the title was changed to the Lehigh Coal and Navigation Co., this was the only source of Anthracite coal until 1825. In 1827, the railroad from mines to Mauch Chunk, 9 miles in length was completed; the coal was transported by gravity, the empty cars being returned to the mine by mules, which rode down with the coal in cars provided for them. This was the origin of the famous switch-back road. In 1829 the Lehigh slack-water navigation was opened to Easton. In 1837 the company commenced work on the Lehigh and Susquehanna railroad, connecting the water of the Lehigh at White Haven, and the Susquehanna at Wilkesbarre, foreshadowing the connection of the great coal interests of these two regions, which has now occurred in the new Lehigh and Wilkesbarre Coal Co.

Beside the coal interests in the Lehigh region, the L. C. & N. Co., owned 6,480 acres of coal lands in the Wyoming region; beside about 1000 acres of leasehold. Containing over 350,000,000 tons of available coal. They have nine collieries in the Lehigh, three at Newport, and two at Plymouth.

The Wilkesbarre Coal and Iron Company, organized a few years ago, had in its possession a tract of land, extending south from the town of Wilkesbarre, on the Susquehanna, near the central portion of Luzerne County. The Company had a large capital, amounting to nearly \$4,000,000, and its property included about 6,000 acres of coal land, besides some thousands of acres of timber lands.

The Honey Brook Coal Company was chartered in 1864, with a capital of \$3,000,000. Its coal fields were very extensive, covering about 8,000 acres, and located in Luzerne and Schuylkill Counties.

The Honey Brook Coal Co's lands are situated in the Beaver Meadow coal district about twenty-four miles above Mauch Chunk, and comprise a portion of the lands of the old Northampton and Luzerne Coal Co., organized in 1836.

The collieries of the H. B. C. Co., were opened by Messrs. J. B. McCreary & Co., in 1859, and the coal was sent to market by this



firm under the name of the North Spring Mountain coal.

They have four collieries, and sent to market over 400,000 tons of coal in 1873. The purchase of the Lehigh Co's land increases their possessions to nearly 23,000 acres; containing eighteen collieries all in fine condition, and able to produce 2,000,000 of tons in 1874.

It also purchased the Hanover coal lands, comprising 1400 acres, a new breaker, the best ever erected. With a capacity of 1000 tons per day; coal opened above water level, and able to produce 250,000 tons per annum.

The majority of the stockholders of the Honey Brook Co., and the Wilkesbarre Coal and Iron Co., being composed of the same parties. It was deemed proper to merge the two companies; the Honey Brook with say 1,000 acres, nineteen collieries, and the Wilkesbarre Coal Co., with some 6000 acres, and fifteen collieries; making one company under the management and expense, capable of producing at least 4,250,000 tons per annum; the best and most saleable coal mined.

The new Company, comprises these three companies with all their tributaries, and begins business with a capital of \$10,000,000.

#### ARTIFICIAL COAL.

There is an artificial coal establishment in France which produces the large amount of 10,000 tons annually. The machine used for the purpose is capable of producing ten tons of the fuel per hour, the whole machine weighing about sixty-five tons, with all its accessories and gearing, including the steam engine. These coal bricks are slightly heavier than natural coal, and their caloric effect is found to be equal, and, in some cases, even superior to the latter. The process of washing removes about five per cent. of the weight of the coal, representing incombustible impurities, and the compressed fuel leaves only six to seven per cent. of ashes. The fuel thus produced in mere coal dust is sold to the different steamship companies and the navy, besides a great quantity for household use, for which purpose it is admirably adapted on account of its regularity of form, great cohesion, entire uniformity, and high heating effect, *Exchange*.

#### COAL TRADE OF CLEVELAND.

Cleveland receives as fine and varied an assortment of Bituminous coal as any city in the world. A great many coal basins, in fact, nearly all the Ohio formation, as well as most of the coals lying west of the Allegheny Mountains in Pennsylvania, here find a market and a distributing point for the west, northwest, eastern, and Canada trade.

The great number of vessels employed in the iron ore and lumber trade naturally seek coal as a back freight for ballast, which enables Cleveland to place coal in distant ports, like Chicago, Milwaukee, and Lake Superior, at mere nominal rates. The bulk of the business has been developed within the last fifteen years, and taking the rapid growth of the manufacturing interests in the west into consideration, it is safe to presume that the trade has not yet reached its ultimate proportions.

Statistics in regard to the tonnage have not been very carefully preserved, but the following table may be relied upon as not being over-estimated, as it is compiled from the returns of the different transportation companies:

	<i>Receipts.</i>	<i>Shipments.</i>	<i>Used in Cleveland.</i>
1865.....	465,555	236,000	229,550
1866.....	583,407	295,280	288,127
1867.....	669,026	334,027	334,999
1868.....	759,104	392,928	366,176
1869.....	922,757	495,800	426,957
1870.....	904,600	482,396	422,210
1871.....	1,165,940	633,765	532,115
1872.....	1,348,160	745,595	602,565
1873.....	1,599,212	854,862	744,350

The coals received may be classed as follows:

Briar Hill or Block coal from the Mahoning region—reach Cleveland via A. & G. W. R. R.  
Massillon coal region—via C. & P. Railway and Canal.

Tuscarawus coal region—via L. S. & T. V. Railway and C. & P. Railway.

Salineville and Hammondsville region—via C. & P. Railway.

Sterling—via C. & P. Railway.

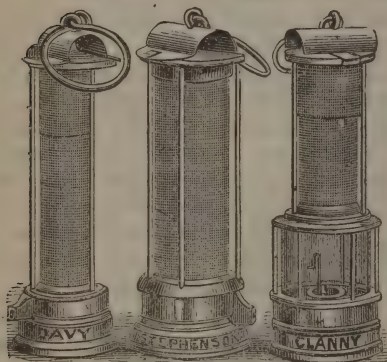
Pittsburgh coal region—via C. & P. Railway.

Straitsville—via C. C. & I. Railway.

Hocking—via C. C. & I. Railway.

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**New Central Coal Co.**  
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**George's Creek Cumberland COAL,**  
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References and practical working tests furnished when required.

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## **The VIRGINIA CARBONITE**

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IT BURNS FREELY LIKE CANNEL COAL.  
AFFORDING A PURE AND BRILLIANT FLAME.  
WITHOUT SMOKE, SULPHUR OR BITUMINOUS OIL.  
ENDURING LONGER THAN ANTHRACITE.  
NO ANNOYANCE FROM DUST AND ASHES.  
NINETY-SIX PER CENT. COMBUSTIBLE.  
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FOR SALE AT \$10 PER TON.

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111 Broadway, Room E.

## **Van Wickle, Stout & Co.,**

Miners and Shippers of  
**'FULTON' AND 'STOUT'**  
**LEHIGH COAL.**  
ROOMS 44 AND 46 TRINITY BUILDING  
P. O. Box 4888, NEW YORK.

# THE COAL TRADE.

A COMPENDIUM OF VALUABLE INFORMATION

RELATIVE TO

COAL PRODUCTION, PRICES, TRANSPORTATION, ETC., AT  
HOME AND ABROAD, WITH MANY FACTS  
WORTHY OF PRESERVATION FOR  
FUTURE REFERENCE.

*CORRECTED TO THE LATEST DATES.*

BY

FREDERICK E. SAWARD.

*EDITOR OF THE "COAL TRADE JOURNAL."*

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# THE COAL TRADE.

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## INTRODUCTION.

The very flattering reception accorded, during 1874, to our handbook, *THE COAL TRADE*, and the constant demand for further information on this important subject, warrant the issue of the present work.

During the past year, the production of coal in America and Great Britain has been seriously reduced, owing to the stagnation of the various branches of the iron trade occasioned by the financial panic in America, in the month of September, 1873. It is not improbable that the decrease in the output in the United States for the year 1874 exceeded 4,000,000 tons, of all qualities.

The price of Anthracite has been much increased during the last year, owing to the very complete control of this branch of the business by the large railway and mining companies. Bituminous ruled much lower in price in all the markets, on the seaboard and in the interior, caused by the reduced demand from railways, steamships, and manufacturing enterprises generally.

There were no strikes in the Anthracite districts of any moment during 1874; the Bituminous districts were vexed with many local struggles against reduction in wages.

In Great Britain, prices of coal and the rate of wages sustained very material reductions during the past year.

Discoveries of coal have been made in Great Britain, on the Continent of Europe and in America, that add largely to the fuel supply of the future.

The United States now stands second in the rank of the coal producing countries of the globe, Great Britain being first and the Empire of Germany third. This proud station has been attained within a short period, and foreshadows the powers and resources of the Republic.

## COAL IN THE UNITED STATES.

The following schedule, compiled from the United States Census Report of 1870, shows the number of Collieries; the horse power of the steam engines employed at the works; the number of persons engaged in the mining and shipment of coal, the capital invested, and the product of each State; during the year 1869. (No returns were collected from California.)

	No. of collieries.	H. P. steam engines.	Hands.	Capital.	Product. Tons.
Pennsylvania ..					
Anthracite...	227	48,809	53,025	\$50,922,285	15,650,275
Bituminous...	361	1,851	17,156	16,989,418	7,798,518
Illinois .....	322	2,645	6,461	4,286,575	2,624,163
Ohio .....	307	3,663	7,567	5,891,813	2,527,285
Maryland .....	22	431	2,727	23,891,600	1,819,824
Missouri .....	56	2,308	1,878	2,587,250	621,930
West Virginia ..	41	177	1,140	1,434,800	608,878
Indiana .....	46	771	1,369	554,412	437,870
Iowa .....	96	145	1,354	618,332	263,487
Kentucky .....	30	125	714	717,950	150,582
Tennessee .....	11	51	419	313,784	133,418
Virginia .....	6	1,297	642	779,200	61,803
Kansas .....	20	....	252	166,430	32,938
Michigan .....	3	83	93	176,500	28,150
Rhode Island...	2	140	75	80,000	14,000
Alabama .....	2	....	57	26,000	11,000
Nebraska .....	3	....	8	850	1,425
Wyoming .....	1	20	165	250,000	50,000
Washington ....	1	80	80	300,000	17,844
Utah .....	6	15	25	44,800	5,800
Colorado .....	3	....	16	36,600	4,500
Total .....	1,566	62,310	92,454	\$110,008,029	32,860,690

The extent of the coal fields of the United States is given as 192,000 square miles, divided as follows:

	Square Miles.		Square Miles.
New England basin.....	500	Illinois basin:	
Pennsylvania Anthracite.....	472	Illinois section.....	36,800
Appalachian basin:		Indiana section.....	6,450
Pennsylvania section.....	12,302	West Kentucky section.....	3,888
Maryland section.....	550	Missouri basin.....	26,887
West Virginia section.....	16,000	Texas basin.....	4,500
Ohio section.....	10,000	Iowa.....	18,000
East Kentucky section.....	8,983	Nebraska.....	3,000
Tennessee.....	5,100	Kansas.....	17,000
Alabama.....	5,330	Arkansas.....	9,043
Michigan basin.....	6,700	Virginia.....	185
		North Carolina.....	310

# THE COAL TRADE.

The product, during the year 1873, amounted to 50,512,000 \* tons, being derived from the following States:

	Tons.		Tons.
Pennsylvania Anthracite.....	22,828,178	Pacific coast lignite.....	500,000
"    Bituminous.....	11,695,382	Tennessee.....	400,000
Ohio.....	3,944,340	Kentucky.....	400,000
Illinois.....	3,500,000	Iowa.....	350,000
Maryland (Cumberland).....	2,674,100	Virginia (Richmond coal field).....	60,000
Indiana.....	1,500,000	Alabama.....	60,000
Missouri.....	1,000,000	Michigan.....	50,000
West Virginia.....	1,000,000	Kansas.....	50,000
Colorado, Wyoming & Utah lignite.....	500,000		

The details for 1874, as far as possible to obtain them at this early date, will be found elsewhere.

The figures, given in round numbers, are estimates made by State Geologists, etc. The West Virginia includes coal via B. & O. R. R., Ohio river, Kanawha river, C & O. R. R., etc., etc.

## PENNSYLVANIA.

### BITUMINOUS COAL DISTRICTS.

The following statistics of Bituminous Coal Trade of Pennsylvania are gathered from the Census Report of 1870, and show the number of Collieries, with the horse power of the steam engines employed; the number of hands engaged in the mining and shipment of coal, the capital invested, the cost of materials furnished, the amount paid out in wages, and the product in tons, in each county; and is for the year 1869:

	No. of col- lieries.	H. P. steam engines.	Hands.	Capital.	Wages.	Cost of materials.	Product. Tons.
Allegheny.....	68	560	6,699	\$6,294,350	\$3,516,668	\$187,482	2,637,269
Beaver.....	16	..	83	116,550	27,650	3,121	28,020
Bedford.....	6	..	262	103,600	94,010	4,270	115,200
Blair.....	6	30	191	150,100	81,500	7,560	161,850
Bradford.....	2	40	750	550,000	560,000	44,600	350,000
Butler.....	46	..	149	73,575	57,000	10,403	63,118
Cambria.....	3	55	527	161,500	287,887	4,380	244,298
Centre.....	7	..	708	626,100	145,978	21,800	184,456
Clarion.....	9	..	103	85,151	41,570	6,775	55,540
Clearfield.....	11	..	279	360,800	147,903	23,137	181,237
Elk.....	2	..	242	366,000	78,920	8,104	78,779
Fayette.....	23	..	108	669,764	267,321	4,842	453,580
Huntingdon.....	7	..	934	251,775	175,014	18,229	163,603
Indiana.....	23	..	108	132,900	25,510	5,140	38,082
Jefferson.....	3	..	8	2,125	1,540	178	3,092
Lawrence.....	11	20	2,115	280,050	190,335	10,077	129,810
Lycoming.....	1	..	30	185,000	2,200	700	2,000
McKean.....	1	60	60	40,000	36,000	2,330	21,951
Mercer.....	34	814	1,994	1,712,225	1,130,827	170,457	659,875
Somerset.....	11	..	35	3,885	3,665	1,024	6,510
Tioga.....	3	36	1,683	100,000	650,000	6,109	733,562
Venango.....	11	..	108	131,100	51,620	1,071	36,230
Warren.....	1	..	2	3,000	200	200	200
Washington.....	27	61	1,640	1,298,118	489,880	24,395	510,077
Westmoreland.....	19	101	1,559	2,209,359	779,690	21,734	754,460
Total.....	361	1,851	16,855	\$16,989,418	\$8,998,015	\$591,327	7,798,518

\* Vide Miscellaneous.



The following table will show the trade of the principal outlets from the coal districts in Western Pennsylvania, the business of the Pennsylvania Railroad Co., *eastward*, output of West Virginia gas coal, together with the imports of coal into the United States:

	Monongahela Slackwater.	Pitts & Con's Railroad.	Little Saw Mill Railroad.	Phila. & Erie.	Penna. R. R. Eastward.	West Virginia Gas.	Imports.
1840	....	....	....	....	....	....	162,867
41	....	....	....	....	....	....	155,394
42	....	....	....	....	....	....	141,521
43	....	....	....	....	....	....	41,163
44	....	....	....	....	....	....	87,073
45	184,200	....	....	....	....	....	85,776
46	311,156	....	....	....	....	....	156,853
47	385,805	....	....	....	....	....	148,021
48	392,774	....	....	....	....	....	196,168
49	393,340	....	....	....	....	....	198,213
1850	491,918	....	....	....	....	....	180,439
51	490,850	....	....	....	....	....	214,774
52	585,233	....	....	....	....	....	183,015
53	628,654	....	....	....	....	....	231,508
54	693,278	....	....	....	....	....	252,865
55	889,360	....	....	....	....	....	287,408
56	353,364	....	....	....	....	....	293,507
57	1,158,939	....	....	....	247,491	....	360,712
58	1,027,866	....	....	....	201,795	....	396,628
59	1,131,467	11,294	....	....	209,907	....	403,928
1860	1,517,909	30,073	....	....	497,549	....	389,986
61	834,630	34,425	....	....	346,289	....	465,434
62	743,358	49,625	103,436	5,385	640,684	....	541,099
63	1,134,570	88,686	121,455	12,787	602,829	....	624,348
64	1,402,828	139,889	115,450	27,777	667,157	....	597,738
65	1,580,791	159,520	131,126	26,042	769,756	....	696,193
66	1,704,212	256,642	123,056	86,359	1,137,881	....	643,294
67	1,202,908	301,652	151,128	51,161	1,349,869	....	521,305
68	1,812,040	320,374	123,642	55,242	1,531,304	165,772	402,299
69	2,100,504	406,386	145,358	64,857	1,721,375	269,158	423,810
1870	2,303,856	469,450	155,001	51,445	1,889,089	249,879	420,683
71	1,944,852	565,014	158,565	45,690	1,787,181	189,763	443,955
72	2,291,220	....	157,102	83,885	2,067,524	217,569	490,631
73	2,094,312	600,000	159,057	81,742	2,254,442	190,673	456,015

The following table furnishes statistics relative to the Semi-Bituminous coal trade of Pennsylvania and Maryland, each district from its commencement :

	Blossburg.	Barclay.	McIntyre.	Broad Top.	Bellefonte.	Tyrone. & Clearfield.	Cumberl'd Md.	TOTAL.
1840	4,235	....	....	....	....	....	....	4,235
41	25,966	....	....	....	....	....	....	25,966
42	13,164	....	....	....	....	....	1,708	14,372
43	6,268	....	....	....	....	....	10,082	16,350
44	14,234	....	....	....	....	....	14,890	29,124
45	29,836	....	....	....	....	....	24,653	54,489
46	16,509	....	....	....	....	....	29,795	46,304
47	29,087	....	....	....	....	....	52,940	82,027
48	33,762	....	....	....	....	....	79,571	113,333
49	32,095	....	....	....	....	....	142,449	174,544
50	23,161	....	....	....	....	....	196,848	220,009
1851	25,000	....	....	....	....	....	257,679	282,679
52	20,000	....	....	....	....	....	334,178	354,178
53	45,507	....	....	....	....	....	533,979	589,486
54	70,214	....	....	....	....	....	659,681	729,895
55	73,204	....	....	....	....	....	662,272	735,476
56	70,669	2,295	....	42,000	....	....	706,450	821,414
57	94,314	6,265	....	78,813	....	....	582,486	761,878
58	41,894	17,560	....	105,478	....	....	649,656	824,588
59	48,592	30,143	....	130,595	....	....	724,354	813,684
60	96,918	27,718	....	186,903	....	....	788,909	1,000,448
1861	112,712	40,835	....	272,625	....	....	269,674	695,846
62	179,334	52,779	....	333,606	8,260	....	317,634	891,613
63	235,843	54,535	....	305,678	12,039	....	748,345	1,355,440
64	384,977	62,058	....	386,645	33,593	....	657,996	1,525,269
65	394,642	73,197	....	315,996	51,881	....	903,495	1,739,211
66	411,759	99,453	....	265,720	70,890	....	1,079,331	1,927,153
67	481,318	74,739	....	244,412	58,137	....	1,193,822	2,052,428
68	603,328	73,675	....	280,936	60,149	....	1,330,433	2,348,621
69	715,094	180,610	....	360,799	89,356	....	1,882,669	2,228,528
1870	733,035	273,335	17,808	313,425	85,276	410,523	1,717,075	3,550,477
71	815,079	378,335	106,130	319,625	79,984	542,896	2,345,153	4,587,202
72	849,262	382,842	171,427	297,473	68,988	431,915	2,355,471	4,557,378
73	991,057	337,644	214,462	350,245	76,042	612,036	2,674,101	5,253,587
74	796,388	236,853	138,907	226,693	63,540	639,630	2,410,895	4,512,906

## BLOSSBURG REGION.

The first coal from this region was sent to market from the Bloss mines in 1840. From this date the trade has enlarged until it amounts to about a million tons annually. The producers of this region are the Fall Brook Coal Company, Morris Run Coal Company, and Blossburg Coal Company, with mines near Blossburg, Tioga county, Pa.

Seventy five miles of railway, in an almost due northern direction, carries the coal from the Blossburg region to Seneca lake, in New York State where it is received into canal boats which deliver it throughout

the State. The railway from the mines also connects with the Erie Railway at Corning, N. Y., thus affording another outlet for the coal from this region.

The most important seam is that known as the Bloss vein, a clean bed of pure coal, from  $4\frac{1}{2}$  to  $5\frac{1}{2}$  feet in thickness.

The coal is sold at a low and uniform price from year to year, and being used for blacksmith, puddling, locomotive and other steam uses, is not subject to the fluctuations common to anthracite coal.

Statistics of the output are as follows:

Year.	Tons.	Year.	Tons.
1840.....	4,235	1871.....	815,079
1850.....	23,161	1872.....	849,262
1860.....	78,918	1873.....	991,057
1865.....	394,642	1874.....	796,388
1870.....	733,035		

#### BARCLAY REGION.

This region is located in Bradford county, Pa., some 36 miles south from Waverly, N. Y. The mines are owned by the Fall Creek Bituminous Coal Co., and the Erie Railway Co. (comprising the lands formerly of the Barclay, and the Towanda Coal Co.'s).

The following table shows the amount of coal shipped from the Barclay Coal Region, since it was first opened, by the several companies which have operated it:

Year	Barclay Coal Co.	Towanda Coal Co.	Fall Creek Coal Co.	Total Products.
1856.....	2,295	.....	.....	2,295
1857.....	6,265	.....	.....	6,265
1858.....	17,560	.....	.....	17,560
1859.....	30,143	.....	.....	30,143
1860.....	27,718	.....	.....	27,718
1861.....	40,835	.....	.....	40,835
1862.....	52,779	.....	.....	52,779
1863.....	54,535	.....	.....	54,535
1864.....	62,058	.....	.....	62,058
1865.....	48,375	7,886	16,336	73,197
1866.....	37,968	31,881	29,604	99,453
1867.....	30,119	27,668	16,953	74,739
1868.....	.....	67,080	6,595	73,675
1869.....	.....	176,307	4,303	180,610
1870.....	.....	196,310	77,025	273,335
1871.....	.....	249,240	129,095	378,335
1872.....	.....	263,960	118,882	382,842
1873.....	.....	252,329	85,315	337,644
1874.....	.....	215,572	21,281	236,853



## MCINTYRE REGION.

The McIntyre Coal Co., whose mines are at Ralston, Pa., on the Northern Central Railway (54 miles from Elmira, N. Y.), which gives them an outlet both north and south to a market, commenced operations in 1870.

Statistics of their business are as below:

Year.	Tons.	Year.	Tons.
1870.....	17,802	1873.....	212,462
1871.....	106,138	1874.....	138,907
1872.....	171,420		

## BROAD TOP REGION.

This region is located in Huntingdon, Bedford and Fulton counties, in the State of Pennsylvania, and occupies a peculiar geological position amongst the coal fields of the State.

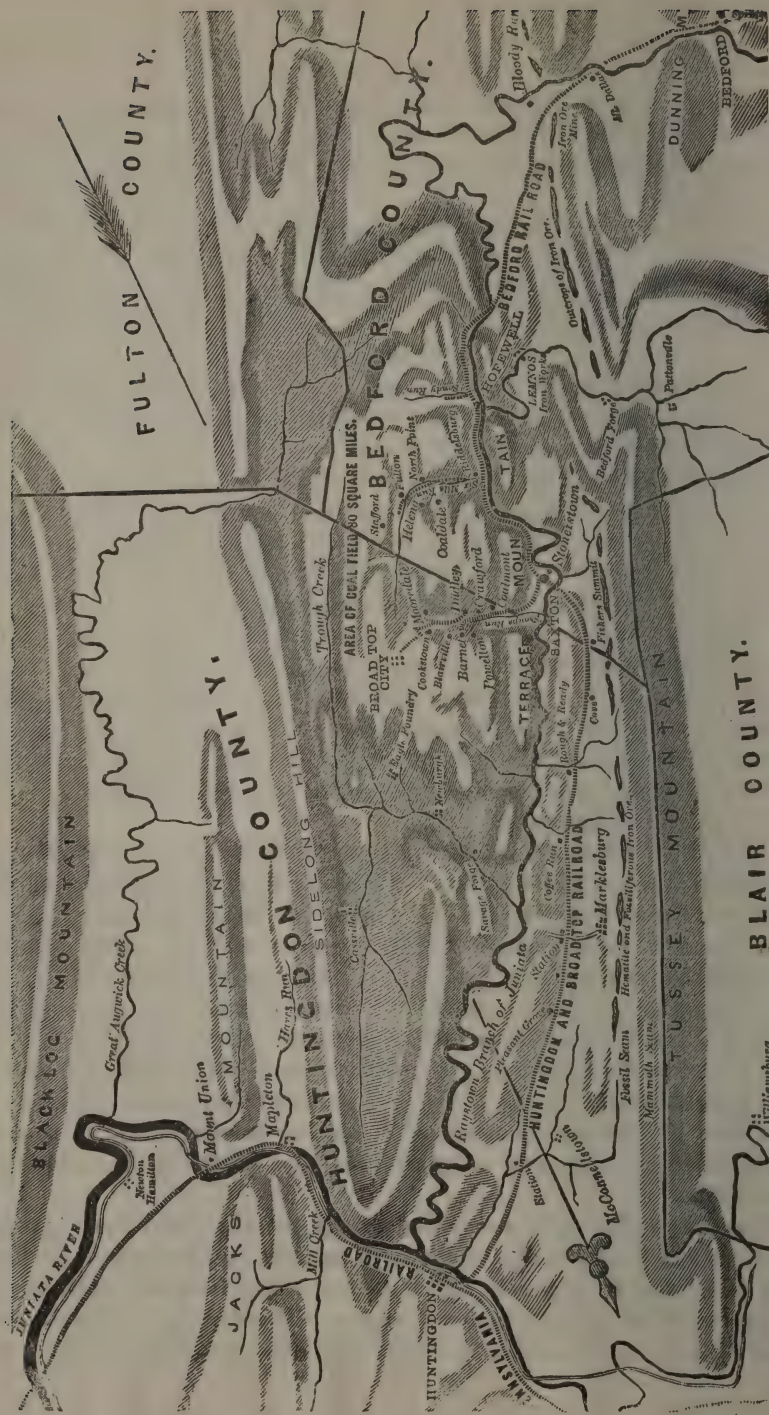
Bounded on the west by Terrace mountain, and on the east by Side-long hill, forming at the northern end a synclinal prong, resting its terminal point on the Juniata river below the town of Huntingdon. The coal field widens towards its southern boundary in Bedford and Fulton counties, ending in a number of terminal fingers.

The coal measures are regular in structure, with gentle wave undulations, dividing the field into several synclinals or basins. The coal is semi-bituminous in its nature, and has been largely used for black-smithing purposes, for generating steam in locomotive, marine and stationary engines, in rolling mills, puddling furnaces and forge fires; with glass works it is an especial favorite. It gives a white ash, is free burning, and easily ignited.

The succession of the measures is not different from that of Western Pennsylvania and Eastern Ohio. There is a base of carboniferous conglomerate lying upon the red shale, from 100 to 200 feet thick, massive, homogeneous, seldom conglomeratic, except as a whole. Over this is a series of lower coal beds, then the barren measures, and over all, the Pittsburgh bed, the beginning of the upper series. The coal beds are mostly identified with those of the head-waters of the Ohio, by their order in the series, by certain general characters, and by their relations to the conglomerate, the one at the base of the whole system, the other at the base of the middle number of the barren measures, a rock as widespread as the true conglomerate, and known as the Mahoning Sandstone.

The area of this field is stated at 80 square miles, and the aggregate thickness of workable coal seams is 26 feet, the larger seams range from five to ten feet in thickness, and the lesser seams from one to three.

An outlet for the coal from this region is afforded by the Huntingdon and Broad Top Mountain Railroad (this was completed in 1856, and



Map of the Broad Top Coal and Iron Region.

After J. P. Lesley.]

during the latter part of that year, 42,000 tons were forwarded from this region to various markets). This line extends from the town of Huntingdon, on the Pennsylvania Railroad, 203 miles west of Philadelphia, to Mt. Dallas in Bedford county, a distance of 45 miles. At Saxton, 24 miles from Huntingdon, a branch road, 10 miles in length, extends to Broad Top City; at Riddlesburg, 5 miles beyond Saxton, is another branch in to Fulton, 5 miles from the main road.

From Mt. Dallas the Bedford and Bridgeport Railroad, 38 6-10 miles in length, extends to the Maryland State line; from this point to Cumberland, Md., via the C. and P. R. R., is 7 miles. This connection gives an outlet to the George's Creek Cumberland coal to the interior markets of Pennsylvania, to Philadelphia and South Amboy, N. J. During 1874, 67,683 tons were forwarded from the Cumberland region by this connection. The Bedford and Bridgeport road is leased to the Pennsylvania Railroad, and operated by them.

The yearly production of this region, since the beginning, has been as follows:

Year.	Tons.	Year.	Tons.
1856.....	42,000	1866.....	265,720
1857.....	78,813	1867.....	244,412
1858.....	105,478	1868.....	280,936
1859.....	130,595	1869.....	360,778
1860.....	186,903	1870.....	313,425
1861.....	272,625	1871.....	319,625
1862.....	333,606	1872.....	297,473
1863.....	305,678	1873.....	350,245
1864.....	386,645	1874.....	226,693
1865.....	315,906		

An analysis, made for the Pennsylvania Railroad Co. in 1859, gives the following results as compared with Pittsburgh coal:

	Broad Top.	Pittsburgh.
Water.....	0.30	1.30
Volatile matter.....	17.55	31.55
Fixed Carbon.....	74.65	61.45
Ash.....	8.50	5.80
	100.—	100.—
Specific gravity.....	1.330	1.285

In regard to the prices obtained for this coal, we are informed that the following are the average rates, f. o. b. at Philadelphia, each year, for the twelve years past:

Years.	Price.	Years.	Price.
1863.....	\$5.25	1869.....	\$4.75
1864.....	6.50	1870.....	4.50
1865.....	7.25	1871.....	4.60
1866.....	5.75	1872.....	4.70
1867.....	4.75	1873.....	5.00
1868.....	4.50	1874.....	4.65



The value of the colliery improvements is stated at \$742,000, and the number of miners and other workmen employed average 468, and the daily capacity for output is stated at 1900 tons.

The tolls and expenses on this coal to Philadelphia, on shipments destined for New York and the eastward, are stated at \$3.15 per gross ton.

The details of business for 1874, names of collieries, operators and owners, are as below:

Colliery.	Proprietor.	Operator.	Tons net sent to market in 1874.
Coalmont,	Chandler & Peabody,	.....	.....
Cumberland,	H. & B. T. B. R. Co.,	J. Whitehead & Co.,	6,207 $\frac{3}{4}$
Crawford,	" "	" "	28 $\frac{1}{4}$
Powelton,	R. H. Powel,	R. H. Powel,	37,650
Barnet,	Orbison, Dorris & Co.,	R. U. Jacobs & Co.,	22,438 $\frac{1}{2}$
Dudley Slope,	Wood & Bacon,	J. M. Bacon,	855 $\frac{1}{4}$
Blairs,	David Blair,	"	10,125 $\frac{1}{2}$
Howe,	"	"	9,790 $\frac{1}{2}$
Mooredale,	Semi-Anthracite C. Co.,	Reakirt Bros. & Co.,	20,563
Fishers,	Fisher & Miller,	Fishers & Miller,	18,077 $\frac{1}{4}$
Carbon,	Rathmell Wilson,	J. E. Mears,	18,157 $\frac{1}{2}$
Cook,	B. Top Improvement Co.,	P. Ammerman,	2,670 $\frac{1}{4}$
Mount Equity	Riddlesburg C. & I. Co.,	Kemble C. & I. Co.,	34,230 $\frac{1}{2}$
Duvall Shaft,	Rathmell Wilson,	" "	.....
Cunard,	R. B. Wigton,	R. B. Wigton,	15,131 $\frac{1}{2}$
Mount Eagle,	Reed, Wilson & Co.,	W. H. Piper,	26,645 $\frac{1}{4}$
Scott Shaft,	Hon. John Scott,	William Scott,	.....
Edge Hill,	Rathmell Wilson,	Dr. Jenkins,	490 $\frac{1}{2}$
Delaware,	"	"	.....
Alexis,	Six Mile Run Coal Co.,	A. Gleason,	2,222 $\frac{1}{2}$

#### SNOW SHOE REGION.

This region is located in Centre county, Pa., covers an area of about eight miles in length, and some four miles in breadth, and is situated on both sides of Beach Creek. The coal finds an outlet to market, via the Bellefonte and Snowshoe and Bald Eagle Valley connections of the Pennsylvania Railroad, it being 47 miles from Snowshoe to Tyrone on the main line.

There is but one company mining in this district, and their yearly business is hardly 100,000 tons. It commenced in the year 1862, with 8,260 tons, and has increased as below:

Years.	Tons.	Years.	Tons.
1862.....	8,260	1869.....	89,356
1863.....	12,039	1870.....	85,276
1864.....	33,593	1871.....	79,984
1865.....	51,881	1872.....	68,988
1866.....	70,890	1873.....	95,257
1867.....	58,137	1874.....	63,540
1868.....	60,149		

Prof. Rogers gives this Snowshoe coal 78.8 of Fixed Carbon, and 21.2 of Volatile Matter and Ashes.



## CLEARFIELD REGION.

The district, known as the "Clearfield," is located in Clearfield county, in the State of Pennsylvania.

This district has within a few years become an important producer of Semi-Bituminous coal, which has a market in the interior cities and towns of Pennsylvania and New Jersey. It is also reshipped from Philadelphia, or South Amboy, N. J., for supplying the New York and eastern markets.

The coal measures are found to be admirably adapted for working, dipping gently toward the Moshannon Creek, which flows through the center of the basin. The lowest seam of coal (A), five feet thick, crops out on the level of this stream. The next (B), sixty feet above, is three to four feet in thickness. Fifty feet above is another seam (C), ranging from two to three and a half feet in thickness. Again, fifty feet above, is found a seam (D) of five feet of good solid coal.

The coal is used for steam purposes under stationary, marine, or locomotive engines, for making iron and steel rails, for glass works, in lime kilns, and for many other purposes, being much liked wherever used; ignites freely, burns readily, and leaves a white ash.

It is not easily friable, and bears transportation remarkably well, which is not the case with many of the Bituminous or Semi-Bituminous coals.

An outlet for the coal from this region is afforded by the Tyrone and Clearfield Branch of the Pennsylvania Railroad, extending from Tyrone on the main line (224 miles west from Philadelphia), to Clearfield, 41 miles.

The Pennsylvania Railroad Company own the railroads, the shipping wharves, and all the means of access to the markets of the Atlantic seaboard, although in some few instances, the mining companies own their cars, which are moved by the Railroad Co., at a reduction in the rate of transportation per ton per mile. Of course the advantage of the connection with a railroad of such magnitude, and wonderful ramifications and communications, gives the miners in this region great facilities.

Mining operations began in this region in 1862; from that date to 1870, we are informed that there had been forwarded 696,377 tons.

Years.	Tons.	Years.	Tons.
In 1870.....	410,523	In 1873.....	592,860
In 1871.....	542,896	In 1874.....	639,630
In 1872.....	431,915		

An analysis of Moshannon coal from this district gave: 71.56 of Fixed Carbon; 18.57 of Volatile Matter; 6.56 Ashes; 2.46 Water, and 0.85



of sulphur. An analysis made of the Kittaning, by Prof. Seeley, gave: 76.39 of Fixed Carbon; 20.10 of Volatile Matter, and 3.51 of Ash.

The coke made from this coal showed, by analysis, 79.09 of Fixed Carbon.

#### MONONGAHELA REGION.

This may truly be called the perfection of a coal region. The Monongahela river for 95 miles possesses every advantage for the production of coal, and it is not surprising that the tonnage is so immense. The seam worked is of uniform thickness, and yields a pure coal, being used for iron making, steam raising, and for gas and domestic purposes.

By means of its slack-water navigation, the Monongahela river is made navigable at all seasons of the year, and boats carrying 800 tons are passed down. The city of Pittsburgh is supplied mainly by railroad, and the larger portion of the coal going down by the river is run down the Ohio and Mississippi to the lower markets. The boats in use are known as "broad horns" carrying 20,000 bushels, "barges" carrying 11,000 bushels, and "flats" carrying 2000 bushels. Our tabular statements show the coal shipments from this district.

#### WESTMORELAND GAS COAL.

This well known coal is mined near Penn and Irwin stations, on the Pennsylvania Railroad, in Westmoreland county; the distance from Philadelphia is 332 miles. The coal mined is the great Pittsburgh bed of bituminous coal; the companies operating in this region are large and influential, doing a business of about a million tons annually; the coal is used in every seaboard city for gas purposes, and commands a high price; The shipping points are South Amboy, N. J., and Greenwich on the Delaware river. The details of the product for 1874 will be found in the coal tonnage.

This coal is in great favor among gas engineers in the United States.

In the dry way, by ordinary process, the Westmoreland coal yields on an average sample as follows:

Charge, 224 pounds, carbonized 3 h. 20 m., produced per ton.....	9,500	cu. ft.
Illuminating power, standard Argand.....	16.62	candles.
Weight of coke, per ton.....	1,544	pounds.
Bushels of coke, per ton.....	40	
Maximum yield of gas per ton.....	10,642	cu. ft.
One bushel of lime purified.....	6,420	cu. ft.

#### Analysis of the coal:

Volatile matter.....	36	per cent.
Fixed carbon.....	58	"
Ash.....	6	"

100

Value of the gas from one ton estimated in pounds of spermacetti....541.26 pounds.

The above results were obtained in the experimental works of the Manhattan Gas Light Company, New York, where the daily average yield of gas from this coal and its equivalent, the "Penn," is about 10,000 cubic feet of candle gas.

#### MERCER COUNTY, PENNSYLVANIA.

The most important coal region in North-west Pennsylvania (running over into Eastern Ohio), is that of Mercer county. The coal produced is what is known as the splint or block coal, and is used in the raw state for smelting iron; the principal location of this peculiar coal is on the Erie and Pittsburgh Railroad, about 75 miles south from Erie, and it finds an outlet to market by this route and the Beaver and Erie canal. The beds vary from two to five feet in thickness, and some half million tons are annually produced, the figures for 1873 aggregating 529,496 net tons.

#### WEST BRANCH REGION.

The Philadelphia and Erie Railroad, which carried 81,742 net tons of bituminous coal in 1873, runs across the northern ends of five coal basins. There is no important development of the first two. In the third, at 67 miles west of Williamsport, is the Wistar Mountain Co.'s mines; at 97 miles, are the works of the Cameron Coal Co. In the fourth, at 117 miles west of Williamsport, is St. Mary's; at 125 miles, Benzinger's; at 128 miles, the Shawmut branch road comes in. In the fifth, at 158 miles, are the Johnsonburg mines. The completion of the P. N. Y. & Buffalo Railroad gives the coal from these basins an outlet to a profitable market.

#### MC KEAN COUNTY, PENNSYLVANIA.

The division of Northern Pennsylvania into counties, from Susquehanna to Warren, inclusive, happens to correspond with the six coal basins. The first basin, as shown in the lower rocks, passes through the southwest corner of Susquehanna county, but destitute of coal until it reaches Sullivan. The second basin is that of Towanda, or Barclay, in Bradford county; the third, that of Blossburg, is in Tioga; the fourth is in Potter; the fifth in McKean; and the sixth in Warren. The body of coal in the fifth basin, in the southern part of McKean county, is so large and important, and is situated so near the Buffalo and Rochester markets, that it is entitled to notice, although no coal is as yet mined there or sent to market. In Sargeant township, at Bishop's Summit, on the head-waters of the Instantar, running into the Clarion on the south, and on Red Mill brook, running into Potato creek and the Allegheny river on the north-east, is a large solid body of several thousand acres of unbroken coal

measures. No other of the coal basins contains so large a body of coal at its northern extremity as this, owing probably to its being situated on the dividing waters where the work of denudation has been less destructive. An excellent railroad route renders the region accessible by a branch from the Buffalo, New York and Philadelphia Railroad up the valley of Potato creek, past Smethport, and by Red Mill brook to Bishop's Summit, the distance being but 108 miles to Buffalo and 150 to Rochester. The valleys of all the streams have been surveyed, but that of Red Mill brook furnishes the easiest possible ascent of the northern slope in crossing the watershed, there being none other as good for railroad grades by at least thirty feet per mile.

Through the ridge at Bishop's Summit the coal basin is continuous; unlike all the other coal basins in the north, no valley cuts down through it, and all the investigations show that its measures are unbroken by any intervening axis to throw them up and squeeze out the coal veins. On the contrary, the high ground lies directly across the body of the coal canoe, which has its prow far to the north, on Red Mill brook. This can be said of no other prong of the great bituminous coal field; all the others that reach the watershed, drained by the Upper Allegheny, are interrupted by a secondary axis that either entirely cuts them off or throws the measures up so near the surface as greatly to reduce their value at that point, and leaves their continuation northward a series of detached and much-broken basins. Partial explorations by borings, trial-pits, and outcrop openings, at points widely separated on the Wernwag lands, on Bishop's Summit, have developed several coal beds of from  $3\frac{1}{2}$  to 4 and 5 feet in thickness. Analyses and practical tests of considerable quantities of this coal, under stationary and locomotive boilers, indicate that it is a good quality of bituminous coal for gas, with excellent steam-generating qualities. No other county in Northern Pennsylvania, not even Tioga, contains so much coal as McKean. A large company, composed of Buffalo capitalists and others, called "The Buffalo Coal Company," has been organized for the development of this region.

#### THE SOMERSET COUNTY COAL BEDS.

Adjoining the Cumberland region, is the newly developed coal field known as the Myer's mills or Salisbury region, situated on the northern boundary of Maryland, in Somerset county, Pa., said to be an extension of the Cumberland coal basin. It is of the same quality and will yield an equal quantity per acre. It is eleven miles from Frostburg, Md., on the line of the Pittsburgh, Washington and Baltimore Railroad, which, with its connections, gives this region an outlet to Baltimore, etc. The area of the great or fourteen-foot bed is about 5,000 acres. The company



at present engaged in coal mining in this region is the "Keystone." They commenced work during the year 1872, and are now shipping 400 tons per day. The property is advantageously situated for the shipment of its production, and the rate of transportation is very favorable. The Cumberland and Elk Lick Coal Co. own 1500 acres of land in this district, but have not commenced mining.

Myers mills is 217 miles from Baltimore, and 112 miles from Pittsburgh, by present routes.

Negro Mountain, or rather the anticlinal bearing this name, plows up the middle of the first great basin, dividing it at this place into two shallow troughs having their greatest depth of coal measures near Myer's mills and Bear creek, the whole lying between the Allegheny mountain on the east and Laurel hill on the west.

Over the back of Negro mountain the coal measures and conglomerate have been swept away, leaving uncovered the red back of the huge anticlinal.

Castleman's river cuts deeply across the Negro mountain anticlinal, unfolding a natural geological section, which has been further elaborated by the railroad cuttings along its northern bank, the whole affording unusual facilities for studying Formations XI and XII, with the posture and stratigraphy of the coal measures shoring on either flank.

Beginning in the railroad cutting immediately west of Garrett Station, the seral conglomerate can be studied up to its floor. In this cutting a thin seam of impure coal has been brought to light. It also exhibits a rather unusual plunge of the strata eastward, carrying the measures down 300 feet in three quarters of a mile; with this exception the measures exist under very gentle dips.

The conglomerate, in its mechanical structure and general appearance, resembles very closely Broad Top and Clearfield. Its thickness has not been obtained, but over 300 feet have been examined, which indicates a greater depth than at Broad Top.

The floor line is distinctly marked in a bold cliff outcrop, ten feet deep, of rather massive conglomerate, slashed with cleavage planes.

On this rests a belt composed, at its base, of thin plates of sandstone graduating into shales and black slate as it approaches the (A) coal seam. The division has been terraced with a flat slope, from the brow of the conglomerate to the coal seam, profiling the two horizons very distinctly.

The first coal seam rests on a thin floor of fire clay. The coal bed has two benches: the lower, 18 inches thick, is an impure cannel coal inclining to block structure; the upper is a medium quality of semi-bitumin-

ous coal with the well marked columnar structure peculiar to the Allegheny coals.

The interval between this and the next small coal seam is composed of thin plates of sandstones with olive-colored shales.

The second workable seam (B) is pre-eminently *the bed* of the lower system of coal measures; not, perhaps, so much from its size and good quality of coal, as from its ready and sure identification, wherever it exists, by the massive bed of limestone on which it rests. The farmers trace it from hillside to hillside, regarding it with peculiar affection as a *double gift*—not only supplying fuel for domestic use, but also with lime to enrich the “glades” in their mountain farms.

The coal in this bed is columnar in structure with plates of mineral charcoal disseminated. In structure and quality it is closely associated with the best Clearfield coal. It will be found a superior fuel for iron working.

The third seam (C) is all pure coal of an excellent quality; but as the bed is high in the measures and does not occupy a wide area in this portion of the field, it has as yet received little attention.

From seam (B) to the top of the scale the measures are composed of very soft flesh and olive-colored shales, which have been rounded and softened into easy rolling slopes and rounded hills.

### WEST VIRGINIA GAS COAL REGION.

What is known as the West Virginia gas coal is mined in Marion, Taylor, Ritchie and Preston counties, in that State, and on the line of the Baltimore and Ohio Railway. The coal is used for gas in the cities of the seaboard, and is much liked. The distances to Baltimore are as follows: From Clarksburg, 301 miles; from Fairmount, 302 miles; from Newburg, 263 miles; from Tunnelton, 260 miles; from Cairo, 355 miles.

The veins are from six to eleven feet in thickness. Analyses of these coals have given the following results:

	Volatile matter.	Fixed carbon.	Ash.
Clarksburg, Main seam.....	56.74	41.66	1.60
“ Cannel.....	49.21	45.43	5.36

The trade to the seaboard began in the year 1868 with 165,772 tons. The business to date has been as below:

Year.	Tons.	Year.	Tons.
1868.....	165,772	1872.....	217,569
1869.....	269,158	1873.....	190,673
1870.....	249,879	1874.....	125,000
1871.....	189,763		

In this region is found the Ritchie Mineral Resin. This mineral is an Asphalt or Semi-Asphalt, similar to the Albertite of Nova Scotia; it is also known as Grahamite. It is found at Cairo, on Hughes river, Ritchie county, 19 miles from Parkersburg, West Virginia, and 15 miles from the Baltimore and Ohio Railroad, over which it is shipped east and west, the Mining Company owning the connections. It is found in a perfectly vertical vein about  $4\frac{1}{2}$  feet in thickness, and three-quarters of a mile in length, and is mined by adits and chambers.

Grahamite has been used for a great many purposes, but the chief sales of late have been to gas light companies for enriching the gas. It is remarkably free from sulphur and ash; is homogeneous; is not liable to decomposition, and requiring no special arrangement in retorting, produces a good coke.

Its photometric value is found to be 32 candles, and in this respect excels the famous Boghead cannel coal.

An analysis has proved it to contain 55 per cent volatile matter, 42 per cent fixed carbon, and 3 per cent ash, only 2 per cent less volatile matter than Albertite, the richest mineral yet imported for gas purposes.

In addition to the outlet eastward via B. & O. R. R., there is the Parkersburg route due west, crossing the Monongahela river at Clarksburg, and thence to the Ohio river at Parkersburg; and the Wheeling route north-westward, crossing the Monongahela at Fairmont, thence down the creek to the Ohio, and thence up the river to Wheeling. Both these branches enter the main coal measures near the crossing of the Monongahela above named, and traverse them to the Ohio. At Clarksburg and northward, down the valley of the Monongahela, is one of the richest coal regions of West Virginia. One of the beds in the neighborhood of this town measures from ten to twelve feet in thickness, with a thinner bed of more highly bituminous nature underlying; from some distance above Clarksburg, they may be followed with scarcely an interruption throughout the whole valley of the Monongahela northward to Pittsburgh.

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### THE CUMBERLAND (MD.) REGION.

The Cumberland, or George's Creek coal field, is located in Allegheny county, at the western extremity of the State of Maryland. The connections with the tide-water markets are via the Baltimore and Ohio Railroad, from the towns of Cumberland and Piedmont, 178 and 206 miles west from Baltimore; via the Chesapeake and Ohio Canal, following the



Potomac river to Georgetown, 184 miles, and Alexandria, 191 miles from Cumberland.

The coal is bituminous, of superior quality, and the vein worked is from seven to fourteen feet in thickness, the full extent of the vein being seldom taken out, the roof being insecure. The mines are located at various distances from the shipping ports, say from  $1\frac{1}{2}$  to 20 miles from Piedmont, and from 11 to 33 from Cumberland.

Prof. J. T. Hodge gives the estimated number of acres of coal land in this region as 17,282, of which perhaps 10,000 of the "big vein" remain unworked.

The Consolidation Coal Co. are the largest producers in the region, and own the Cumberland and Pennsylvania, and the Cumberland Branch, lateral Railroads.

In the year 1842 the Cumberland coal field was enabled to send its product to market by the branches of the Baltimore and Ohio Railroad, made into this field. In 1850 the Chesapeake and Ohio Canal was finished to Cumberland, Md.; and by it 4,042 tons were shipped in that year.

The production of Cumberland coal from 1842 to 1874, inclusive, was 26,338,681 tons, carried to market by the following routes, via Baltimore and Ohio Railroad, 17,548,434 tons; Chesapeake and Ohio Canal, 8,585,966 tons; and Pennsylvania Railroad, 204,281 tons. During the year 1872, a branch railroad was completed, connecting this region with the Pennsylvania Railroad, and 22,021 tons were carried over it in that year.

At the Piedmont end of this region, the Hampshire and Baltimore Company, and the Virginia Coal and Iron Company, connect by their own tramroads with the B. & O. Railway.

A description of this coal region would hardly be complete without some account of the quality of the coal produced. At Colt's Armory, in Hartford, it has been found that for steam generating it is better and cheaper than anthracite. The Superintendent of the United States Armory at Springfield, Mass., made very thorough tests; each variety of three different classes of coal was used for six consecutive days, with the following reported results:

	Lackawanna.	Pittston.	Cumberland.
Pound per h. p. per hour...	4.01	4.02	3.03
Cost per gross ton.....	\$8.30	\$7.85	\$9.10
Cost per horse power.....	1 5-10 cts.	1 4-10 cts.	1 2-10 cts.

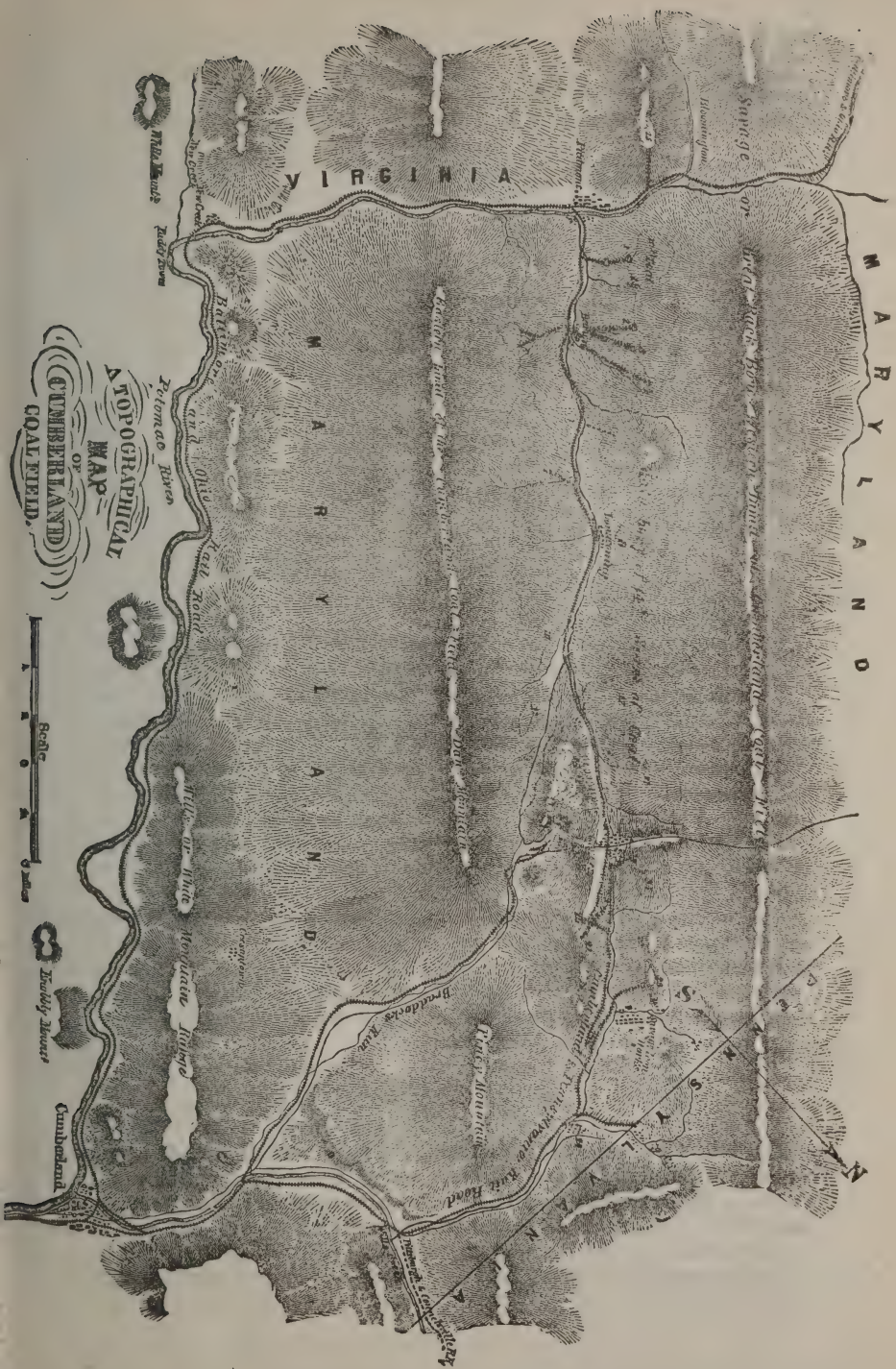
And it is therefore alleged that bituminous coal is the more economical fuel as a steam generator, making more heat and creating more power than harder coals.

The total Cumberland coal trade by railroad and canal from the beginning is shown in the following schedule:

Years.	Total by B. & O. R. R.	Total by C. & O. Canal.	P. S. Line branch to the P. R. R.
1842.....	1,708	.....	.....
1843.....	10,082	.....	.....
1844.....	14,890	.....	.....
1845.....	24,653	.....	.....
1846.....	29,795	.....	.....
1847.....	52,940	.....	.....
1848.....	79,571	.....	.....
1849.....	142,449	.....	.....
1850.....	192,806	4,042	.....
1851.....	174,702	82,978	.....
1852.....	268,459	65,719	.....
1853.....	376,219	157,760	.....
1854.....	503,836	155,845	.....
1855.....	478,486	183,786	.....
1856.....	502,330	204,120	.....
1857.....	465,912	116,574	.....
1858.....	395,405	254,251	.....
1859.....	426,512	297,842	.....
1860.....	493,031	295,878	.....
1861.....	172,075	97,599	.....
1862.....	218,950	98,684	.....
1863.....	531,553	216,792	.....
1864.....	399,354	258,642	.....
1865.....	560,293	343,202	.....
1866.....	736,153	343,178	.....
1867.....	735,669	458,153	.....
1868.....	848,118	482,325	.....
1869.....	1,230,518	652,151	.....
1870.....	1,112,928	604,137	.....
1871.....	1,494,814	850,339	.....
1872.....	1,537,368	816,103	22,021
1873.....	1,580,710	778,802	114,589
1874.....	1,576,160	767,064	67,671

The following is interesting as showing the average price of Cumberland coal at Baltimore, the freight thence to Boston, and the price at which it was delivered at Boston during a series of years past:

Year.	Average for year.	Av. freight to Boston.	Av. cost delivered in Boston.
1861.....	\$3.44	\$2.25	\$ 5.69
1862.....	4.23	2.42	6.65
1863.....	5.57	3.28	8.85
1864.....	6.84	3.39	10.23
1865.....	7.57	3.79	11.36
1866.....	5.94	3.53	9.47
1867.....	4.97	2.68	7.65
1868.....	4.71	3.21	7.92
1869.....	4.97	2.83	7.80
1870.....	4.72	2.64	7.36
1871.....	4.72	2.73	7.45
1872.....	4.66	3.06	7.72
1873.....	4.84	3.17	8.01
1874.....	4.50	1.50	6.00



VIRGINIA

M A R Y L A N D

TOPOGRAPHICAL  
MAP  
OF  
CUMBERLAND  
COAL FIELD.

Scale  
1 1/2 Miles

Travellers

Cumberland



The output during 1874 was produced by the following parties, and distributed by the routes named:

Names.	B. & O. R. R. Tons.	C. & O. Canal. Tons.	P. S. Line. Tons.	Local. Tons.	Total. Tons.
Consolidation.....	264,928	141,313	34,392	26,925	467,558
George's C. C. & I. Co..	256,438	38,788	.....	1,052	296,278
Maryland.....	106,946	155,616	256	2,726	265,544
New Central.....	147,523	95,502	.....	400	243,425
American.....	65,777	122,668	517	.....	188,962
Hamp. & Bal. (Mid.)....	40	10,041	.....	100)	.....
" (Nat.)....	8,404	53,034	11	254)	171,078
" Va. Mines	109,094	.....	.....	100)	.....
Borden Mining.....	10,336	111,357	32,421	4,303	158,417
Atlantic & George's Cr..	96,224	12,534	.....	3,755	112,513
Franklin.....	99,347	.....	.....	75	99,422
George's Creek Mining.	82,540	.....	.....	50	82,590
Swanton.....	81,440	.....	.....	298	81,738
Potomac.....	76,563	.....	.....	220	76,783
Piedmont C. & I. Co....	57,932	.....	74	300	58,306
Virginia C. & I. Co.....	54,911	.....	.....	141	55,052
Blaen Avon.....	271	36,211	.....	18	36,500
New Reading.....	14,289	.....	.....	.....	14,289
North Branch.....	2,440	.....	.....	.....	2,440
Total.....	1,535,443	767,064	67,671	40,717	2,410,895

Charges on the coal carried will be found in the "Rates of Transportation on Bituminous Coals."

The entire length of this coal field is from 50 to 60 miles; viz., from the head waters of George's Creek, near Frostburg, about 15 miles to the north-east of Piedmont, to those of the north branch of Potomac, some 30 miles to the south-east. The width of this valley averages 6 miles from outcrop to outcrop of the lower seams of coal. It is narrowest at the northern end, and widens out considerably at the southern. The total thickness of the coal containing strata is about 1400 feet, but this thickness does not pervade the entire area, as to the south of Piedmont and Bloomington the erosion has been greater, and it is only a few isolated hills that contain the upper seams of coal, and notably the "big" or fourteen feet seam.

In the entire thickness there are many seams of coal, but there are only five or six of a thickness of 3 feet or over, as follows, viz: commencing with the lowest, known as the "Parker" and "Bluebaugh" veins at the northern end of the region, and which lie near the bottom of the formation, and are crossed by the river and railroad at Piedmont,

About 150 feet above is the 6 feet seam.

" 300 " " 3 " (Savage.)

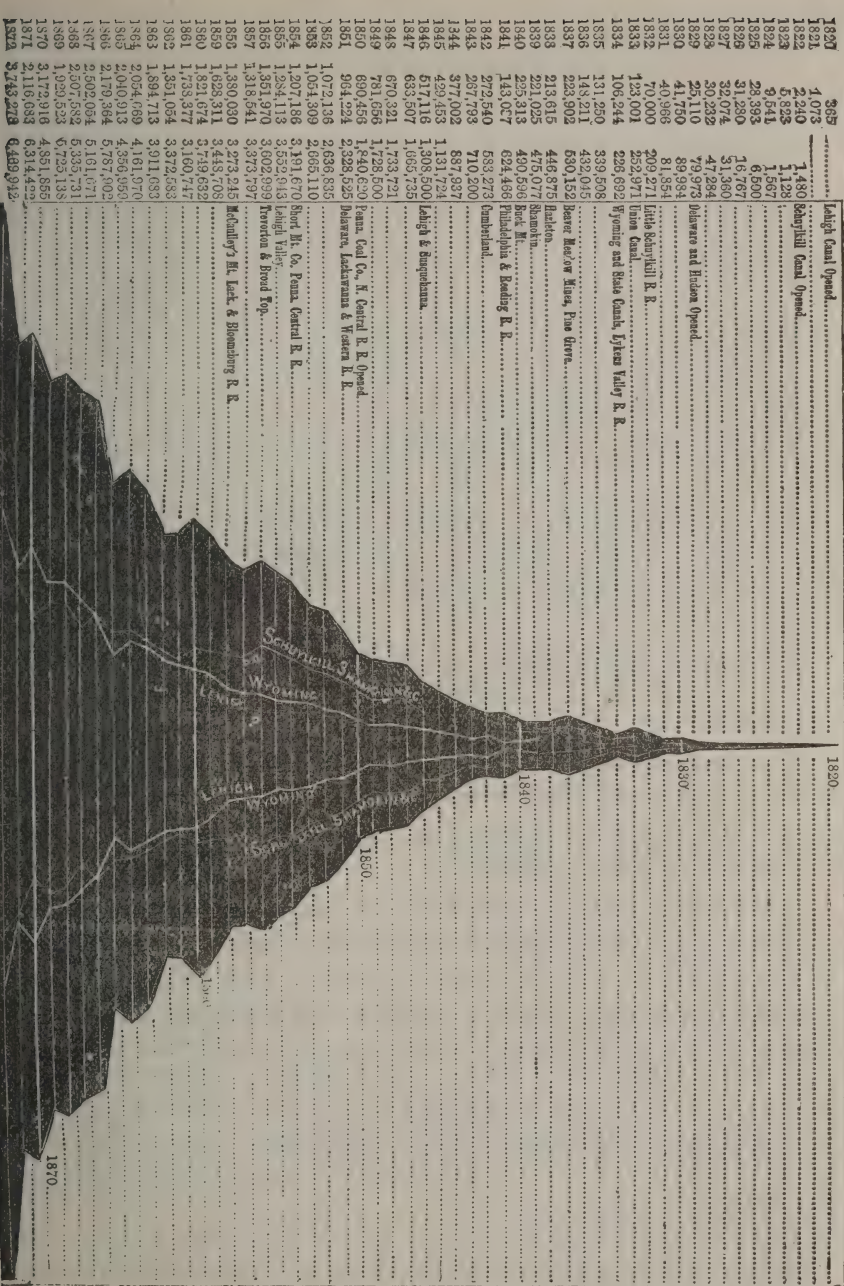
" 380 " " 5 feet 8 inch seam.

" 600 " " 5 " 9 "

" 850 " " 14 " of "Big Vein."

The Baltimore and Ohio Railroad Co, have recently made a thorough and exhaustive trial of the "six feet seam" from the North Branch Co.'s mines at Bloomington, and the results have been so satisfactory as to induce them to make arrangements for its regular supply and use in their engines, etc.; so that there is now a good prospect for the development of the lower seams of coal, and the lands containing them becoming of productive value.

# PROGRESS OF THE ANTHRACITE COAL TRADE OF PENNSYLVANIA.



Year	Total	Yearly
1820	1,300	1,300
1821	1,280	1,280
1822	1,260	1,260
1823	1,240	1,240
1824	1,220	1,220
1825	1,200	1,200
1826	1,180	1,180
1827	1,160	1,160
1828	1,140	1,140
1829	1,120	1,120
1830	1,100	1,100
1831	1,080	1,080
1832	1,060	1,060
1833	1,040	1,040
1834	1,020	1,020
1835	1,000	1,000
1836	980	980
1837	960	960
1838	940	940
1839	920	920
1840	900	900
1841	880	880
1842	860	860
1843	840	840
1844	820	820
1845	800	800
1846	780	780
1847	760	760
1848	740	740
1849	720	720
1850	700	700
1851	680	680
1852	660	660
1853	640	640
1854	620	620
1855	600	600
1856	580	580
1857	560	560
1858	540	540
1859	520	520
1860	500	500
1861	480	480
1862	460	460
1863	440	440
1864	420	420
1865	400	400
1866	380	380
1867	360	360
1868	340	340
1869	320	320
1870	300	300
1871	280	280
1872	260	260
1873	240	240
1874	220	220
1875	200	200
1876	180	180
1877	160	160
1878	140	140
1879	120	120
1880	100	100
1881	80	80
1882	60	60
1883	40	40
1884	20	20
1885	0	0
1886	0	0
1887	0	0
1888	0	0
1889	0	0
1890	0	0
1891	0	0
1892	0	0

### ANTHRACITE COAL.

Anthracite coal is found in an area of about 470 square miles, in Luzerne, Carbon, Schuylkill, Northumberland, Dauphin, and Columbia counties, in the State of Pennsylvania.

To show the growth of the business, we append the following schedule of the production:

Year.	Tons.	Year.	Tons.
1820.....	365	From 1860 to 1870.....	114,319,161
From 1820 to 1830.....	533,194	1871.....	15,198,063
From 1830 to 1840.....	5,940,270	1872.....	18,929,263
From 1840 to 1850.....	21,893,153	1873.....	19,585,178
From 1850 to 1860.....	63,981,897	1874.....	19,785,003

The census report of 1870 enumerated 327 collieries; 829 engines, of 48,709 horse power; 43,938 men and 9,078 boys were employed; \$50,922,285 of capital was stated to be invested, and \$22,980,293 was paid out for wages.

There are three great divisions—which are named from their locations—the first or Southern, the second or Middle, and the third or Northern coal fields.

The Southern coal field lies principally in Schuylkill county, and hence it is often called the Schuylkill region.

The Mahanoy (often included in the Schuylkill) and Lehigh regions constitute the Middle coal field.

The Northern coal field is in Luzerne county, and embraces what is known as the Wyoming, Lackawanna, Scranton, and Wilkesbarre regions.

In regard to the probable exhaustion of these fields, Prof. Sheaffer gives the following figures: Average total thickness of coal in the Southern coal field, 75 feet; Middle and Northern fields, 45 feet; total cubic quantity, 26,361,076,000 tons. Deduct half for waste in mining, preparation, and faults, then we still have 13,180,538,000 tons. The amount mined from 1820 to 1870 (50 years) was 206,666,325 tons. Thus we have yet in store 12,973,878,675, which at 25,000,000 tons per annum, will supply us for 520 years.

Beside the production reported above, it is estimated that some 3,000,000 tons are annually consumed in the coal regions by the engines, workmen, and local enterprises, the returns for which are not furnished by the colliery proprietors.



The comparative production of the three coal fields during the past ten years has been as below :

Year.	Schuylkill.	Wyoming.	Lehigh.
1864.....	2,642,218	3,960,836	2,054,669
1865.....	3,735,802	3,256,638	1,822,535
1866.....	4,633,487	3,736,616	2,128,867
1867.....	4,334,820	5,328,312	2,062,446
1868.....	4,414,356	5,990,813	2,507,582
1869.....	4,748,960	6,068,365	1,929,583
1870.....	3,720,403	7,599,902	3,040,303
1871.....	5,124,780	6,481,171	2,249,356
1872.....	5,106,451	9,194,808	3,610,674
1873.....	5,209,156	10,047,241	3,243,168

Within the year or two past, the collieries in the several districts have gradually been bought up by a few of the leading companies who now control the market. They are Philadelphia and Reading C. & I. Co.; Delaware and Hudson Canal Co.; D. L. & W. R. R. Co.; Lehigh and Wilkesbarre Coal Co.; Lehigh Operators; Pennsylvania Coal Co.

The prices fixed upon for the product during the year 1874 were for Wilkesbarre, Lackawanna and Schuylkill, based on the following list for March delivery f. o. b. at the shipping points:

Lump.....	\$4.55	Egg.....	\$4.90
Steamer.....	4.65	Stove.....	5.35
Grate.....	4.75	Chestnut.....	4.35

Advancing as follows, for

April.....	5 cents per ton.	August.....	15 cents per ton.
May.....	10 " "	September.....	15 " "
June.....	10 " "	October.....	15 " "
July.....	15 " "	November.....	15 " "

This was adhered to except that Stove coal in June was advanced 15 cents.

The Lehigh Coal Exchange made rates for March, 1874, as follows: Lump, \$5.35; Broken and Egg, \$5.30; Stove, \$5.35, Chestnut, \$4.35; and advanced as per above schedule.

The average rates, for the year 1874, were calculated to be, f. o. b.: Lump, \$4.99; Steamer; \$5.09; Broken, \$5.09; Egg, \$5.34; Stove, \$5.79; Chestnut, \$4.79.

Season contracts were made at \$4.70 for Lump; \$4.80 for Steamer; \$4.90 for Broken; \$5.05 for Egg; \$5.50 for Stove, and \$4.50 for Chestnut.

The Scranton sales were continued in 1874 although the D. L. & W. Company made circular rates the same as Wilkesbarre.

We append the result of the auction sales:

	Jan. 28.	Feb. 25.	March 25.	April 29.	May 27.	June 24.
Steamer.....	\$4.85	\$4.53	\$4.50	\$4.60	\$4.65	\$4.89
Broken.....	4.75	4.56	4.60	4.73	4.82½	5.00
Egg.....	5.22	4.74	4.83	4.90	4.98	5.14
Stove.....	5.25	5.19	5.25	5.33	5.47½	5.65
Chestnut.....	4.40	4.20	4.24	4.37	4.41½	4.63
	July 29.	Aug. 26.	Sept. 30.	Oct. 28.	Nov. 25.	Dec. 30.
Steamer.....	\$5.00	\$5.11	\$5.23	\$5.48	\$5.50	\$.....
Broken.....	5.05	5.16	5.25½	5.30	5.23½	5.24½
Egg.....	5.27½	5.43½	5.35	5.70	5.70	5.28½
Stove.....	5.77½	5.95	6.04	6.17	6.15	6.03½
Chestnut.....	4.72½	4.79	4.96½	5.00	4.89	4.88

The range of circular prices is indicated by the following table:

	Mar. 1873.	Dec. 1873.	Mar. 1874.	Nov. 1874.
Lump.....	\$4.45	\$5.05	\$4.55	\$5.55
Steamer.....	4.55	5.15	4.55	5.65
Broken.....	4.65	5.25	4.75	5.75
Egg.....	5.90	5.40	4.90	5.90
Stove.....	5.35	5.70	5.35	6.40
Chestnut.....	4.45	5.05	4.35	5.35

The Pennsylvania Coal Company followed the prices made by the other companies until November.

In the month of February, 1874, the combination agreed upon a basis for fixing the product, which was to be proportioned to each interest in the following ratio, based on a probable business to tide water of 10,000,000 tons:

	Per cent.		Per cent.
Reading Co.....	25.85	Delaware and Hudson.....	18.37
Lehigh Valley.....	15.98	D. L. & W. R. R.....	13.80
Jersey Central.....	16.15	Pennsylvania Coal Co.....	9.85

This was carried out only in part, the business amounting to but 8,248,928 tons, furnished by the companies in the following per centages:

Company.	Per cent.	Tons.
Philadelphia & Reading.....	23.64	1,949,716.15
Delaware & Hudson C. Co.....	17.44	1,438,547.18
Lehigh Valley Railroad.....	16.63	1,371,335.18
Lehigh & Wilkesbarre C. Co.....	16.78	1,383,221.00
D. L. & W. Railroad.....	13.29	1,096,319.00
Pennsylvania Coal Co.....	12.22	1,009,787.19
Total.....	100.—	8,248,928.10

The rate of transportation charged by the Reading Railroad Company on the individual coal carried, during the year 1874, was \$1.92 per ton, subject to drawbacks on coal sold on contract; the rate from Mauch Chunk, by rail to the tide-water shipping ports, was \$1.95 per ton in April, and \$2.31 in November, advancing each month equal to forty per cent of the advances in the price of coal.

Coastwise freights during the year were very low from all points, so low as 90 cents per ton, by large vessels to Boston having ruled, from Port Johnston.

Statement of average prices for Schuylkill coal, as returned by firms drawn to furnish the same, for fixing rate of wages to be paid:

Month—1874.	Average.	Wages paid above basis.
December.....	\$2.63	4 per cent.
November.....	2.76 <sup>80-100</sup>	9 “
October.....	2.60 <sup>1-10</sup>	3 “
September.....	2.65 <sup>59-100</sup>	5 “
August.....	2.54 <sup>17-100</sup>	1 “
July.....	2.54 <sup>1-10</sup>	1 “
June.....	2.49 <sup>66-100</sup>	Basis paid.
May.....	2.44 <sup>68</sup>	“
April.....	2.38	“
March.....	2.66 <sup>98-100</sup>	6 per cent.
February.....	2.75 <sup>78-100</sup>	9 “
January.....	2.70 <sup>70-100</sup>	7 “

The year of the Philadelphia and Reading, and the Lehigh Valley Railroad Company ends November 30.

The details of the production of each region or company, designated above, for the year 1874, will be found under the head of coal tonnages.

As showing the value of anthracite, for metallurgical purposes, we append the following results of analyses made for that purpose:

	Wyoming.	Schuylkill.	Lehigh.
Moisture.....	1.38	1.35	1.30
Vol. combustible matter.....	3.52	3.78	3.05
Ash.....	3.24	5.81	3.54
Fixed Carbon.....	91.86	89.06	92.11
	100.00	100.00	100.00



## COAL IN PORTUGAL.

There were 18,000 tons of coal mined in Portugal in the year 1872.

## IMPORTS AND EXPORTS OF COAL.

By the courtesy of Dr. Edward Young, Chief of the Bureau of Statistics, at Washington, D. C., we are enabled to give the following interesting information in regard to the imports and exports for the years 1870, 1871, 1872 and 1873 :

IMPORTS.			EXPORTS.		
Years.	Tons.	Value.	Years.	Tons.	Value.
1870 .....	420,688	\$1,110,310	1870 .....	227,918	\$1,306,353
1871 .....	443,955	1,132,771	1871 .....	277,951	1,369,230
1872 .....	490,631	1,291,206	1872 .....	401,078	1,963,911
1873 .....	456,015	1,589,663	1873 .....	584,633	2,914,075

Statement of imports into and of exports from the United States, during the fiscal year ended June 30, 1874.

Countries.	IMPORTS.	EXPORTS.	
	Bituminous. Tons.	Bituminous. Tons.	Anthracite. Tons.
Argentine Republic.....	5	43	517
Brazil .....	435	1,675	430
Central American States .....	.....	....	35
Chili .....	....	....	496
China .....	....	.....	1,779
Danish West Indies and Guiana. ....	26	7,628	1,136
French West Indies and French Guiana ..	15	10,240	....
Miquelon, Langley and and St. Pierre ....	....	....	66
All other French possessions. ....	210	....	....
Germany .....	99	....	....
England .....	52,821	....	....
Scotland .....	24,088	....	....
Newfoundland, Prince Edward Island and Labrador .....	....	....	162
Nova Scotia and New Brunswick .....	263,268	2,109	28,053
Quebec .....	22	256,863	324,777
British Columbia.....	49,276	....	....
British West Indies and Honduras .....	193	5,585	1,753
British Guiana .....	....	525	....
British Africa .....	20	....	302
Australasia .....	107,418	....	....
Mexico .....	....	2,112	3,343
Dutch East Indies .....	....	....	464
Peru .....	15	....	....
Portugal .....	....	60	....
Azores and Madeira. ....	17	....	10
Sandwich Islands. ....	....	....	863
Spain .....	....	....	3
Cuba .....	74	54,638	29,948
Porto Rico .....	....	218	64
United States of Columbia. ....	....	18,258	7,292
Uruguay .....	26	115	....
Venezuela .....	....	421	314
Africa .....	....	....	100
Total .....	498,028	361,490	401,912

Statement showing the districts from which the coal exported was sent:

Districts.	Bituminous. Tons.	Anthracite. Tons.	Districts.	Bituminous. Tons.	Anthracite. Tons.
Alexandria, Va. ....	1,113	.....	New Bedford, Mass. ....	.....	40
Bath, Me. ....	69,264	2	New London, Ct. ....	.....	15
Boston, Mass. ....	.....	815	New Orleans, La. ....	12	.....
Buffalo, N. Y. ....	2,003	5,178	New York, N. Y. ....	.....	47,945
Champlain, N. Y. ....	.....	120,179	Oswego, N. Y. ....	.....	187,731
Cuyahoga, O. ....	216,203	11	Passamaquoddy, Me. ....	.....	446
Detroit, Mich. ....	.....	2,760	Pearl River, Miss. ....	.....	1
Duluth, Minn. ....	78	.....	Pensacola, Fla. ....	224	.....
Erie, Pa. ....	8,956	430	Perth Amboy, N. J. ....	.....	586
Genesee, N. Y. ....	2,774	6,243	Philadelphia, Pa. ....	33,484	23,160
Georgetown, D. C. ....	350	.....	Portland, Me. ....	.....	8
Huron, Mich. ....	31	.....	Richmond, Va. ....	450	.....
Marblehead, Mass. ....	.....	2	Sandusky, O. ....	26,515	.....
Minnesota, Minn. ....	.....	22	San Francisco, Cal. ....	32	.....
Newark, N. J. ....	.....	6,338			
Total .....	300,772	141,980	Total .....	60,718	259,932
			Grand total....	361,490	401,912

### SAN FRANCISCO, CAL.

So favorably is this city located, she is enabled to draw her fuel supplies from all quarters of the globe. The tabulated statement will show the relative percentages that each district furnishes.

The first production of coal on the Pacific coast was made in 1852, at Newport, on Coos Bay, Oregon Territory.

The mines on Lake Washington, near Seattle, King County, Washington Territory, have been worked since 1873. The quality of coal produced is excellent.

The Monte Diablo mines, located near the City of San Francisco, were discovered in the year 1849.

On Vancouver's Island, in the British possessions, the best grade of coal is found at the village of Nanaimo, about sixty miles northeast of Victoria.

The mines at Bellingham Bay, in Washington Territory, were opened in 1857. These mines are located near Sehome, and belong to the Bank of California.

California contains deposits of coal of various qualities, which need the turn of the machine shop and rolling mill to make them at once of value to their owners.





We give below a comparative statement, which will indicate at a glance the increased consumption of the several varieties at San Francisco.

	1869.	1870.	1871.	1872.	1873.
Foreign .....	109,000	135,168	113,483	174,212	181,884
Eastern .....	38,600	30,820	13,291	29,669	27,167
Domestic.....	184,100	167,183	188,420	230,586	221,982
Total .....	331,700	333,171	315,194	434,467	431,039

We append the details of the receipts at this city for the year 1874 :

	Tons.		Tons.
Anthracite .....	14,263	Vancouver's Island .....	51,017
Australian .....	139,109	Bellingham Bay.....	15,975
Coos Bay .....	41,857	Rocky Mountain .....	363
Cumberland.....	15,475	Seattle .....	9,027
English .....	37,826	Mount Diablo (11 months) .....	185,596

Experiments were made by the United States Government, with reference to determining the amount of the several kinds of coal which would be required for a calorific equivalent to a cord of the best oak wood, with the following results:

	Pounds.
Nanaimo, Vancouver's Island, British Columbia.....	1,800
Bellingham Bay, Washington Territory.....	2,400
Seattle, Washington Territory.....	2,400
Rocky Mountain, Utah.....	2,500
Mount Diablo, California .....	2,600
Coos Bay, Oregon.....	2,600

The following table will show the relative value of the coals found on the Pacific coast compared with the Cumberland, of Maryland :

	A	B	C	D	E	F
Alaska ....	7.94	7.96	60.0	40.0	12.3	5.41
Coos Bay.....	10.24	7.35	60.7	39.3	6.2	6.91
Seattle.....	8.38	8.57	63.0	37.0	16.6	5.71
Black Diamond .....	8.38	8.73	51.6	48.4	8.0	5.71
Bellingham Bay ..	10.58	5.51	67.0	33.0	16.0	7.21
California Anthracite .....	9.70	6.12	88.6	11.4	5.0	6.61
Cumberland, Maryland .....	13.92	3.52	88.2	11.8	3.2	9.48

EXPLANATION OF HEAD—A, heating power, one pound water; B, sulphur to ton, in pounds; C, coke per cent; D, volatile matter; E, ash per cent; F, relative value per pound.

## CLEVELAND, OHIO.

This city receives as fine and varied an assortment of Bituminous coal as any city in the world. A great many coal basins—in fact, nearly all the Ohio formation, as well as most of the coals lying west of the Allegheny Mountains, in Pennsylvania—here find a market and a distributing point for the West, Northwest, Eastern and Canada trade.

The great number of vessels employed in the iron ore and lumber trade naturally seek coal as a back freight for ballast, which enables

Cleveland to place coal in distant ports, like Chicago, Milwaukee and Lake Superior, at mere nominal rates. The bulk of the business has been developed within the last fifteen years, and, taking the rapid growth of the manufacturing interests in the West into consideration, it is safe to presume that the trade has not yet reached its ultimate proportions.

The total receipts of coal at Cleveland from 1828 to 1852 amounted to but 662,862 tons, derived as below :

Year.	District.	Tons for the year.
1828	Tallmadge .....	30
1829	Tallmadge .....	708
1830	Tallmadge .....	1,178
1840	Tallmadge, New Castle, Trenton .....	6,028
1850	Tallmadge, Clinton, New Castle, Youngstown, Cuyahoga Falls, Girard and Rochester. ....	83,850
1851	Tallmadge, Clinton, New Castle, Youngstown, Cuyahoga Falls, Girard and Rochester. ....	107,135
1852	Tallmadge, Clinton, New Castle, Youngstown, Cuyahoga Falls, Girard and Rochester. ....	137,926

The canal from Akron was opened July 4, 1828, and during that year thirty tons of coal were sent by this route to Cleveland. The coal was taken from the mines to the canal with teams, to be shipped, and the business was continued in this way until 1832, when the canal reached the coal fields near Masillon, which were on its banks.

This represents the consumption of coal at this point up to 1838. It was not until after this, and after the Briar Hill coal began to reach this place, in 1843, that lake steamers could be induced to use it. Since 1845 it has supplanted wood on the steamers of the lower lakes. What is taken on board at the docks cannot be separated from the consumption of the city.

Until 1845, the entire trade of the lakes in Bituminous coal was in the hands of Cleveland dealers. About this time, possibly a year or two earlier, Erie began to ship coal, the joint receipts from the interior of the two places being only 45,136 tons.

The following table of distances from points in coal districts to Cleveland is interesting :

	Miles.
Coventry .....	45
Canton .....	64
Silver Creek .....	60
Millersburgh .....	87
Masillon .....	63
Masillon, by Grafton .....	74
Atwater .....	56
Salineville .....	88
Steubenville .....	121
Sandy Lake, by Ashtabula .....	115
Youngstown .....	66
Sharon, Pa. ....	80
Straitsville, Perry County, by Zanesville. ....	176

## PITTSBURGH, P A.

Situated as it is, in the midst of a coal producing country, and having so many connections by rail and water with coal and iron deposits, this city has taken a high position among the industrial centres of the United States.

The amount of business that is done in coal and coke, including that sent to other points, is 4,350,000 tons (of 2000 pounds) per year. The bulk of the Bituminous coal shipped over the western end of the Pennsylvania Railroad comes eastward, while the coke goes west.

The business of the Monongahela slack-water navigation in 1873 amounted to 2,094,312 tons of coal and 63,270 tons of coke.

During last year there was quite a business done in Anthracite coal.

The amount of coal and coke received during 1870, 1871, 1872 and 1873 was :

1870.	Bushels.	1872.	Bushels.
Coal .....	67,388,725	Coal .....	115,065,146
Coke .....	11,594,000	Coke .....	43,927,765
1871.		1873.	
Coal .....	96,785,635	Coal .....	97,455,535
Coke .....	23,357,400	Coke .....	32,470,037

This includes the coal for the city use and that destined for points on the rivers below Pittsburgh.

The rapid growth of the coke trade of Pittsburgh and vicinity is a most significant illustration of its industrial development. Of this trade, what is known as Connellsville coke forms a large part, and will continue to do so. It is mined in Fayette County, Pa. It is stated that an acre will yield, over and above the pillars, if properly mined, 13,300 tons. It weighs 80 pounds to a bushel, and when properly coked, 100 bushels of coal produce 125 bushels of coke, and the coke weighs 40 pounds to a bushel; that is, a given quantity of the coal gains one quarter in bulk and loses three eighths of its weight, or 100 pounds of coal makes 62½ pounds of coke. This coke has become very celebrated not only about Pittsburgh, but throughout the Western States, where it is extensively used for foundry purposes in melting pig iron, selling in competition with Lehigh coal. It is used in blast furnaces for smelting iron from the ore, and is sometimes mixed with the Western coals. It is also an excellent fuel for locomotive use. Its freedom from sulphur has given this coke the reputation of being the best known.

An analysis made by J. B. Britton of a sample of Connellsville coke, average of forty-nine pieces, shows :

Moisture .....	.49	Phosphoric acid .....	.03
Ash .....	11.33	Carbon .....	87.46
Sulphur .....	.69		

The ash of the coke contained 47 per cent of silica and 47 per cent alumina.



The receipts at this city during 1873 and 1874 are as below :

BITUMINOUS COAL IN TONS OF 2000 LBS.		
Route of Transportation	1873.	1874.
Allegheny Valley Railroad.....	223,359 15	229,326 10
Castle Shannon Railroad.....	125,109 05	136,227 15
Connellsville Railroad.....	157,210	184,655
Pennsylvania Railroad.....	514,259 15	417,544 15
Pittsburgh, Charleston, and Virginia Railroad.....	2,500	37,50 0
Pittsburgh, Cincinnati, and St. Louis Railroad.....	253 341	210,222
Saw Mill Run Railroad.....	159,057	87,637 10
West Penn Railroad.....	99,692 15	101,178 15
Monongahela Slackwater.....	2,094,312 10	2,503,504 10
Not otherwise reported. Estimated.....	74,400	173,291.
Total.....	3,703,272	4,081,407 15
COKE IN TONS OF 2000 LBS.		
Connellsville Railroad.....	61,310	82,741
Pennsylvania Railroad.....	412,582 15	514,273 15
West Penn Railroad.....	61,337	36,718 15
Monongahela Slackwater.....	63,270	38,790
Not otherwise reported, estimated.....	46,901	70,030
Total.....	647,300 15	742,523 10

The above schedule, prepared by the *American Manufacturer*, of Pittsburgh (with the exception of the Slack Water Company), represents the amount of coal used in the city and vicinity. The *Pittsburgh Commercial* gives the "production" of coal and coke in the Pittsburgh district, during the year, as below :

COAL.		Tons.
Pennsylvania Railroad.....	1,652,787	
West Pennsylvania Railroad.....	194,008	
Pittsburgh and Connellsville Railroad.....	403,976	
Pittsburgh, Cincinnati and St. Louis Railroad.....	576,222	
Allegheny Valley Railroad.....	240,165	
Pittsburgh, Charleston and West Virginia Railroad.....	30,096	
Saw Mill Run Railroad.....	89,676	
Pittsburgh and Castle Shannon Railroad.....	122,925	
Monongahela Slack Water.....	2,196,153	
Cleveland and Pittsburgh Railroad.....	273,205	
Erie and Pittsburgh Railroad.....	260,972	
* Pittsburgh, Fort Wayne and Chicago Railroad.....	1,282,410	
Total.....	7,322,595	
COKE.		Tons.
Pennsylvania Railroad.....	961,275	
Pittsburgh and Connellsville Railroad.....	630,729	
Monongahela slack water.....	32,375	
Total.....	1,624,379	

The prevailing method of reporting the coal output is the bushel ; eighty pounds to the bushel, twenty-five bushels to the ton of 2,000 pounds.

\* Mahoning Valley estimated.

## ST. LOUIS, MO.

Extending for a distance of from one hundred to two hundred miles, on opposite sides of the Mississippi River, are two of the most important and remarkable deposits in this country.

On the east bank of the river, reaching nearly across the State, lie the celebrated coal fields of Southern and Central Illinois, the magnitude of which renders the supply practically inexhaustible for all time to come. On the west bank of the river, and underlying the State of Missouri, south of the Missouri River, are deposits of iron, lead, copper, zinc, tin, nickel and other minerals, the extent of which are only equalled by the fuel supply opposite. St. Louis, the central point between these fields, has always been the principal market for Illinois coal, and with the development of the mineral resources of Missouri, is now assuming considerable importance as a manufacturing point, ranking as the third city in the Union.

There are many valuable deposits of coal in Missouri, but they are too far distant for a regular supply, while the mines near St. Louis produce an inferior quality for manufacturing purposes. The mines of Southern Illinois are near the city and river, the quality is good, the supply endless in quantity, and the coal easily and cheaply mined.

By far the largest proportion of the Bituminous coal received is from the Belleville district, in St. Clair County, Illinois. This county contains 450 square miles of coal, and the last census returns show a production of 793,810 tons.

The principal seam worked is five to seven feet in thickness, and is economically mined. Analysis of this coal shows, water 6; volatile matter 33.8; fixed carbon 55.2; ash 5.

Prof. Worthen says: "This coal compares favorably with the average Bituminous coals of this or adjoining States."

The mines are reached by shafts, generally from 80 to 100 feet deep. New openings are being made every year, and it is seldom that a mine gets so poor as to be permanently abandoned. For some years the slack and refuse was piled about the banks, and left to burn where it might. Of late, coke works have been established at East St. Louis and this refuse material is utilized.

East St. Louis is the point at which the coal from the various districts is centred and distributed.

On the line of the St. Louis and South-eastern Railroad there are eleven mines.

On the Ohio and Mississippi Railroad are the Trenton mines, Nichol's mine, Lebanon, Bartlett Coal Co., Alma mines, O'Fallon's, two pits; the Abbey Company, Smith & Wonderly, and E. Schrader's mines.

The Toledo, Wabash and Western, and the Indianapolis and St. Louis Railroads bring to East St. Louis ten or fifteen cars of coal every day.

On the Illinois and St. Louis Railroad are the Pittsburgh mines, Western Mining Company, Hazard, Wilson & Co., Bluff mines, Harmony mines, Schurman & Bros.

The Iron Mountain Railroad also bring the Semi-Anthracite coal known as the "Spadra" from Arkansas.

Some distance below St. Louis, are the Big Muddy coal-fields, finding an outlet at Grand Tower, Ill.; this coal is consumed by the furnaces at South St. Louis, being brought in barges. Its use is generally in connection with coke.

The Abbey Coal Mining Co., of St. Louis, have 1000 acres underlaid with six and seven foot veins. Two shafts are in operation, supplying 1750 bushels daily, 1000 of which is consumed by the Vandalia road, their trains to and fro stopping for supplies.

The following statement, prepared for us by W. C. B. Allen, shows the coal trade of St. Louis for 1874 :

ROUTES OF TRANSPORTATION.	TONS.	BUSHEL.
Belleville and Southern Illinois Railroad.....	311,105	7,777,625
Illinois and St. Louis Railroad.....	196,956	4,923,905
Ohio and Mississippi Railroad.....	161,390	4,034,750
St. Louis and Southeastern Railroad.....	161,766	4,044,150
St. Louis, Vandalia, Terre Haute, and Ind. Railroad.....	121,485	3,037,120
Indianapolis and St. Louis Railroad.....	24,880	622,000
Cairo and St. Louis Narrow-gauge, (St. Louis).....	22,650	566,250
Cairo and St. Louis, Big Muddy smelting coal, Furnaces South St. Louis.....	61,500	1,537,500
Chicago, Alton and St. Louis Railroad.....	6,500	162,500
Toledo, Wabash and Western Railroad.....	2,100	52,500
Rockford, Rock Island, and St. Louis Railroad.....	1,500	37,500
Iron Mountain and Southern Railroad.....	1,755	43,880
St. Louis County wagon receipts (estimated).....	64,000	1,600,000
Ohio and Cumberland Rivers (Barges).....	15,415	385,375
Lower Mississippi River.....	2,000	50,000
Illinois River.....	1,320	33,000
Pittsburgh gas coals.....	41,000	1,025,000
Other sources.....	500	12,500
Total receipts for 1874.....	1,196,622	29,915,550
Total receipts for 1873.....	1,200,000	30,000,000
Decrease, 1874.....	3,378	84,450



## BUFFALO, N. Y.

At this growing city, which has the advantages of rail, lake, and canal navigation, there is an increasing business done in both Anthracite and Bituminous coals.

The distribution of the coal received here is divided into city trade for family use, rolling mills, furnaces, manufactories and gas works; interior trade for gas works, family use and manufacturing purposes; and all points of the West are supplied (principally with Anthracite,) which is taken by vessels from this port to Chicago, Milwaukee, Duluth, etc.

The receipts for a series of years have been as below :

Year.	BITUMINOUS.			ANTHRACITE.	
	By Lake.	By Canal.	By L. S. and M. S. R. R.	By Canal.	By Rail.
1863.....	71,323	12,451	.....	123,319	.....
1864.....	65,224	35,237	.....	154,214	.....
1865.....	68,141	42,322	.....	143,998	.....
1866.....	68,142	62,172	.....	248,716	.....
1867.....	101,108	67,124	.....	223,718	.....
1868.....	91,457	73,596	.....	318,353	.....
1869.....	99,460	108,972	.....	112,914	187,000
1870.....	94,796	163,437	.....	177,027	250,000
1871.....	88,517	80,660	76,063	102,185	300,000
1872.....	78,879	95,500	109,397	190,994	330,000
1873.....	87,724	125,000	190,000	255,044	479,885
1874.....	67,467	70,000	140,000	252,262	320,000

The shipments of Bituminous eastward by canal from Buffalo were as below :

1863.....	20,125	1869.....	62,690
1863.....	30,043	1870.....	65,900
1865.....	28,283	1871.....	60,522
1866.....	50,202	1872.....	53,198
1867.....	57,495	1873.....	68,210
1868.....	59,766	1874.....	46,995

There was 80,000 tons of Blossburg Semi-Bituminous received in 1873, and 50,000 tons in 1874, by railroad. The amount of Anthracite that was shipped westward, via the lakes, was 510,443 tons in 1873, and 244,500 in 1874. There was 60,000 tons of Blossburg Semi-Bituminous shipped west, via the lakes, in 1873, and 40,000 tons in 1874.

Freights ranged from 40 cents to \$1.25 per ton to Chicago, Ill.

The ton weight in use here is that of 2000 lbs.

We are indebted to Wm. Thurstone, Esq., Secretary of the Buffalo Board of Trade, for the above figures.

## BALTIMORE, MD.

At this city an extensive business in coal, both Anthracite and Bituminous, is done. At Locust Point, the terminus of the Baltimore and Ohio Railroad, on the environs of this fine city, is the shipping point for immense quantities of Bituminous coal from the Cumberland region of

Maryland, the Gas coal regions of West Virginia, the Somerset County mines, and the Youghiogheny Gas coal of Pennsylvania.

The highest price at which the Cumberland coal was sold at Baltimore was in March, 1865, when the price was \$14 per ton; it rapidly declined, until, in December of the same year, the price was but \$7 40 per ton. The trade in Anthracite at present is entirely local, none being shipped from Baltimore to other and more distant points.

There are some 350,000 tons of Anthracite received yearly at Baltimore, by the following routes: From Millersburg, Pa., 112 miles, the Lykens Valley Red Ash; from Sunbury, Pa., 138 miles, the White Ash; by Susquehanna tide water canal; from Port Richmond, Philadelphia.

Little or no Lehigh coal reaches Baltimore. The Anthracite is usually of good quality. All the sales are at 2,240 pounds to the ton. Anthracite sold as high as \$13 50 per ton for Lump coal, in May, 1865.

The gross rates of transportation on the Baltimore and Ohio Railroad on coal for shipment:

<i>Tons of 2000 pounds.</i>		<i>Tons of 2000 pounds.</i>	
February 10, 1865—		March 19, 1866—	
Cumberland to Locust Point.....	\$5 25	Cumberland to Locust Point.....	\$3 00
Piedmont to Locust Point.....	5 60	Piedmont to Locust Point.....	3 35
Newburg to Locust Point.....	9 50	Newburg to Locust Point.....	5 50
Fairmont to Locust Point.....	9 00	Fairmont to Locust Point.....	6 00
May 11, 1865—		March 18, 1867—	
Cumberland to Locust Point.....	\$3 75	Cumberland to Locust Point.....	\$2 70
Piedmont to Locust Point.....	4 10	Piedmont to Locust Point.....	3 05
Newburg to Locust Point.....	6 50	Newburg to Locust Point.....	5 00
Fairmont to Locust Point.....	7 00	Fairmont to Locust Point.....	5 50
		March 16, 1868—	
		Cumberland to Locust Point.....	\$2 30
		Piedmont to Locust Point.....	2 05
		Newburg to Locust Point.....	4 50
		Fairmont to Locust Point.....	5 00

The shipments from Baltimore of Cumberland coal to foreign ports were as below:

1871.....	20,207	1872.....	59,546
1872.....	54,363	1874.....	70,675

The Northern Central Railroad took 232,938 tons Anthracite to Baltimore in 1874, against 242,754 tons in 1873 and 244,757 tons in 1872.

The amount of West Virginia Gas coal that is received averages about 200,000 tons annually, being 217,569 tons in 1872 and 190,673 tons in 1873. There were also shipped during 1874 some 30,000 tons of Youghiogheny Gas coal, received from Western Pennsylvania by the Baltimore and Ohio Railroad.

The following schedule shows the business of the Baltimore and Ohio Railroad Company, giving the disposition of the coal that paid freight (coal for the use of the company not included) :

Years.	Received at Locust Point.	To Balti- more.	Line Trade.
1862.....	150,987	8,740	978
1863.....	277,505	26,106	3,936
1864.....	302,277	56,181	1,103
1865.....	353,434	49,396	5,340
1866.....	620,888	77,856	20,967
1867.....	629,946	58,377	7,615
1868.....	696,465	39,766	29,780
1869.....	1,187,366	136,704	33,910
1870.....	1,069,390	113,929	36,319
1871.....	1,438,816	113,286	39,500
1872.....	1,482,240	60,630	118,389
1873.....	1,806,829	65,694	147,195

BUSINESS OF 1874.—The Baltimore and Ohio Company state that the amount of Cumberland coal carried for the year ending in 1874 was 1,407,377 tons, but do not furnish the details of distribution.

The year of the Baltimore and Ohio Railroad ends October 31.

### COAL AT NEW YORK.

The computation of the consumption of coal at New York and vicinity (say within a radius of ten miles) has been a most difficult matter. There has been no statement published on which to base any calculations, and there is no record kept, as in other cities, to show conclusively the annual tonnage. It appears that during the year 1874, there were brought to the various points of receipt and shipment of Anthracite coal in this vicinity the following amounts :

	Tons.
By Delaware and Hudson Canal, to Rondout.....	1,438,547
By Pennsylvania Coal Company, to Newburgh and Weehawken.....	1,156,758
By Delaware, Lackawanna and Western Company, to Hoboken.....	1,085,590
By New Jersey Central, to Elizabethport.....	758,284
By New Jersey Central, to Port Johnston.....	1,400,272
By Morris Canal, to Jersey City.....	150,000
By Delaware and Raritan Canal.....	250,000
To Trenton and South Amboy.....	889,415

Total Anthracite.....7,127,866

Of the above, it is estimated that there were consumed within a radius of ten miles around New York the following amounts :

	Tons.
One third of Delaware and Hudson, or.....	450,000
One half of Pennsylvania Coal Company, or.....	550,000
One third of Hoboken shipments, or.....	360,000
One half of Trenton and Amboy shipments, or.....	440,000
Two thirds of Delaware and Raritan Canal, or.....	160,000
Two thirds of Morris Canal, or.....	100,000
One quarter of Elizabethport and Port Johnston, or.....	550,000

Total Anthracite.....2,610,000



## CINCINNATI, OHIO.

There is an increasing business done in coal at this city. The qualities received embrace the Youghiogeny from the neighborhood of Pittsburgh, Pa.; the Pomeroy from the vicinity of Pomeroy, Ohio; the Kanawha from West Virginia, including the Splint, Bituminous and Cannel; and the Anthracite from Pennsylvania.

The business in coke is gradually growing, though the sale is somewhat affected by the low price of coal. The business of the year ending August 31st, 1874, embracing the gas company, Mc Keesport, Connellsville, and city made coke, amounted to 2,850,000 bushels.

Of Anthracite coal, the quantity consumed in this city is small, not exceeding, during the past year, 112,500 bushels. The price delivered to dealers is about \$10.00 per ton.

The shipments of coal from the city to interior towns have largely increased, having reached 5,933,100 bushels in 1873-74, compared with 4,472,400 bushels in 1872-73. This is, to a large extent, traceable to a growing demand for coal to take the place of wood as fuel. The rapid consumption of the wood, in many localities, and the increasing value of the same, is forcing the people to look in the direction of some other kind of fuel. This demand will doubtless increase.

The following table shows the receipts of coal of the various kinds, at this city.

KINDS.	BUSHELS.	
	1873-74.	1872-73.
Youghiogeny.....	24,014,681	24,962,373
Ohio River and Kanawha.....	10,398,153	11,075,072
Cannel.....	710,000	1,162,052
Anthracite.....	112,000	75,000
Total.....	35,234,834	37,274,497

The following table shows the average annual quotation for Youghiogeny coal, delivered, during a period of eleven years :

YEAR.	CTS. PER BUSHEL.	YEAR.	CTS. PER BUSHEL.
1863-64.....	38.34	1869-70.....	15.27
1864-65.....	26.13	1870-71.....	15.82
1865-66.....	24.42	1871-72.....	22.68
1866-67.....	17.86	1872-73.....	20.72
1867-68.....	22.01	1873-74.....	16.04
1868-69.....	14.69		

It must be remembered, however, that this is by no means the average price of the coal consumed, for these averages depend on the regular weekly quotations, and to take them as the measure of the average price, would be to assume that equal quantities were consumed at the different seasons of the year, which would be fallacious. For comparative purposes, these figures are the best that can under the circumstances be furnished, but for absolute cost they are unsafe criteria.

The following table will show the number of bushels of coal of all kinds, received at Cincinnati, for the years named :

YEAR.	BUSHEL.	YEAR.	BUSHEL.
1853-54 .....	8,158,000	1864-65 .....	16,467,023
1854-55 .....	10,356,000	1865-66 .....	18,022,990
1855-56 .....	7,500,000	1866-67 .....	18,446,266
1856-57 .....	14,500,000	1867-68 .....	17,500,000
1857-58 .....	15,000,000	1868-69 .....	25,500,000
1858-59 .....	12,392,701	1869-70 .....	30,300,000
1859-60 .....	14,600,000	1870-71 .....	22,972,000
1860-61 .....	12,500,000	1871-72 .....	30,790,796
1861-62 .....	8,500,000	1872-73 .....	37,274,497
1862-63 .....	8,000,000	1873-74 .....	35,234,834
1863-64 .....	15,975,366		

It is safe to calculate the bushel at eighty pounds, which would give twenty-eight to the ton of 2,240 lbs.

For the figures given above we are indebted to Col. Sydney D. Maxwell, Superintendent of the Cincinnati Chamber of Commerce.

## CHICAGO, ILL.

The coal trade at the city of Chicago is an ever increasing one, as may be seen from the statistics given elsewhere.

The great element of prosperity in the trade, outside of a first-class demand, was the unusually low rates of freight by lake, ranging from 40 cents per ton, from Buffalo, to \$1.25 at the close of the past season. The amount of coal carried over from 1873 was large, this has been taken up, and the opening of Spring navigation will find small stocks on hand. The growth of the trade in coal is remarkable; it has more than doubled during the last five years. Very little wood is now used in Chicago, owing to the cheaper price of coal.

The following are the varieties of coal used and the ports or places from which they are received :

Briar Hill coal from Cleveland, O.	By Lake.
Erie coal from Erie, Pa.	do.
Straitsville, Hocking coal and similar coals, Ohio.	{ P. C. & St. L. Railroad. and P. F. W. & C. Railroad.
Midway and Walnut Hill coal from Pennsylvania.	{ " " "
Indiana Block coal from Brazil, Indiana; and vicinity.	{ C. D. and N. Railroad and I. C. Railroad.
Wilmington coal from Wilmington, Ill., and vicinity.	{ C. and St. Louis Railroad.
Other Illinois in small quantities	{ I. C. Railroad and C. B. and Q. Railroad. Also, Illinois and Michigan Canal.

The foregoing are the principal Bituminous coals, Briar Hill and Erie ranking first as a domestic coal in quality, Midway and Walnut Hill second, Hocking coal third, Indiana Block fourth, Illinois coals fifth. The four last are used as steam coals. The Illinois coals probably lead the others in quantity.

Blossburg Semi-Bituminous coal, received via the lakes, from Buffalo, is also handled, and dealt in very extensively.

Anthracite is received mainly by the lakes. In 1872, some 15,000 tons were received by railway.

The following tables are evidence of the growth of the coal trade at this city :

#### RECEIPTS OF ALL KINDS OF COAL.

Years.	Tons.	Years.	Tons.
1852 .....	46,233	1855 .....	109,576
1853 .....	38,548	1856 .....	93,020
1854 .....	56,774	1857 .....	171,379

Years.	By Lake.	By Rail.	By Canal.	Total tons.
1858 .....	76,571	10,719	3,364	87,290
1859 .....	111,506	11,766	7,932	131,204
1860 .....	117,646	6,218	7,216	131,080
1861 .....	168,879	2,407	12,803	184,089
1862 .....	195,099	7,681	15,643	218,423
1863 .....	244,624	12,066	27,506	284,196
1864 .....	251,038	43,991	28,246	323,275
1865 .....	288,771	41,23	15,060	344,854
1866 .....	385,906	86,675	23,612	496,193
1867 .....	391,313	140,319	14,576	546,208
1868 .....	450,137	197,152	10,945	658,243
1869 .....	510,876	279,793	8,326	799,000
1870 .....	522,580	364,894	....	887,474
1871 .....	515,253	562,043	4,176	1,081,472
1872 .....	586,585	804,226	7,213	1,398,024
1873 .....	737,944	913,205	17,118	1,668,267
1874 .....	661,583	686,267	11,646	1,359,496

#### SHIPMENTS OF ALL KINDS OF COAL FROM CHICAGO.

Years.	Tons.	Years.	Tons.
1852 .....	1,441	1863 .....	15,245
1853 .....	2,998	1864 .....	16,779
1854 .....	5,48	1865 .....	24,190
1855 .....	12,153	1866 .....	34,190
1856 .....	16,161	1867 .....	69,170
1857 .....	23,942	1868 .....	83,399
1858 .....	15,641	1869 .....	95,620
1859 .....	19,886	1870 .....	110,467
1860 .....	20,364	1871 .....	96,833
1861 .....	20,093	1872 .....	177,687
1862 .....	12,947	1873 .....	243,637

#### RECEIPTS BY LAKE.

ANTHRACITE.		BITUMINOUS.	
Years.	Tons.	Years.	Tons.
1870 .....	340,730	1870 .....	181,850
1872 .....	495,765	1872 .....	90,820
1873 .....	538,837	1873 .....	199,107



The details of the receipts during 1874 are shown below :

Received by	Tons.
Lake.....	661,583
Illinois and Michigan Canal.....	11,646
Chicago and Northwestern Railroad.....	2,092
Illinois Central Railroad.....	35,921
Chicago, Rock Island and Pacific Railroad.....	18,135
Chicago, Burlington and Quincy Railroad.....	27,661
Chicago and Alton Railroad.....	254,030
Chicago, Detroit and Vincennes Railroad.....	147,701
Lake Shore and Michigan Southern.....	455
Pittsburgh Fort Wayne and Chicago Railroad.....	64,314
Pittsburgh, Chicago and St. Louis Railroad.....	133,232
Baltimore and Ohio Railroad.....	2,726
Total.....	1,359,496

The Custom House records for the year 1871 were destroyed at the great fire.

The shipments from this city are mainly by railroad, to points in the West and Northwest. The coal consumed at Chicago now amounts to 1,500,000 tons annually.

The ton weight designated in these tables is that of 2000 pounds.

### COAL AT BOSTON, MASS.

The details of the receipts of coal at Boston for year ending December 31, 1874, are as below :

From	Tons.
Alexandria, Virginia.....	86,705
Georgetown, District of Columbia.....	27,753
Philadelphia, Pennsylvania.....	578,432
Baltimore, Maryland.....	197,513
Other places (New York, etc.).....	235,113
Great Britain.....	2,780
Nova Scotia.....	48,658
Total.....	1,175,954

The receipts of foreign and domestic coal at this port have been as follows :

Years.	Foreign. Tons.	Domestic. Tons.	Years.	Foreign. Tons.	Domestic. Tons.
1874.....	51,438	1,125,516	1868.....	103,901	742,481
1873.....	87,700	1,076,673	1867.....	117,440	680,221
1872.....	90,739	1,068,781	1866.....	159,380	676,376
1871.....	109,013	822,808	1865.....	209,225	538,917
1870.....	115,022	819,890	1864.....	188,786	516,665
1869.....	110,466	764,017	1863.....	180,445	589,921

These figures include all the coal going to this port, both for the home trade and for the points reached by the railroads centering here.

The Boston *Shipping List* gives the following as the highest and lowest prices of Anthracite and Provincial coal for ten years past, at that point:

Years.	Anthracite, per ton.	Nova Scotia, per ton.
1874.....	\$7 00@ 9 00	\$5 75@ 7 75
1873.....	8 00 10 00	7 00 9 00
1872.....	7 00 10 00	6 00 8 50
1871.....	7 00 10 00	5 75 7 00
1870.....	7 00 11 00	5 75 7 25
1869.....	7 50 11 00	7 25 9 00
1868.....	7 00 12 00	7 50 9 00
1867.....	7 50 10 00	7 25 9 25
1866.....	9 00 15 00	7 50 9 50
1865.....	8 75 17 00	6 25 18 00

### COAL IN RHODE ISLAND.

The Mount Hope coal mine, in Portsmouth, Rhode Island, contains the hardest Anthracite in this country, if not in the world. It is much lighter colored than the ordinary Anthracite, and in many places it strongly resembles plumbago. The mine yields about 15,000 tons a year, and it is pretty good fuel, though when the beds were opened, many years ago, it was thought to be next to worthless. It sells for from \$2 50 to \$4 50 a ton at the mine. Large quantities of this coal are consumed at the mine, in smelting copper from Chili.

### RICHMOND, VIRGINIA.

Our friends at this city kindly forward the following statistics of the coal trade for the year 1874 :

	Tons.
Received via Richmond and Danville Railroad, Chesterfield County coal.....	18,690
Received via Richmond and Petersburg Railroad (Clover Hill), Chesterfield County coal.....	17,104
Received via River Potomac, and Fredericksburg Railroad, Henrico County coal	2,000
Received via canal, Carbonite, coke and coal.....	20,440
Received via dock (Cumberland and Anthracite), Northern coal.....	69,088
Received via Chesapeake and Ohio Railroad (eastward), ores and coal.....	75,621

#### COAL SHIPPED.

Westward, via canal.....	20,294
Eastward, via vessels.....	6,240
Eastward, via vessels (Clover Hill from Osborne's).....	10,474

## COAL IN ARKANSAS.

The coal field of Arkansas has an area of 12,000 square miles, in twelve counties. The coal found is semi-bituminous or semi-anthracite. A bed of semi-bituminous coal nine feet thick is reported in Sebastian County.

The Spadra semi-anthracite is the only coal that is known in market to any extent, and an account of its location, etc., will prove interesting.

"This name is given to a deposit of semi-anthracite coal, found at Spadra, in Johnson County, now being worked by the Spadra Coal and Iron Company.

"It lies almost horizontal, with a slight dip to the north. It crops out on the river bank, and is traceable along the river front. On digging anywhere the same vein, from  $3\frac{1}{2}$  to 4 feet thick, is invariably struck within 35 feet of the level of the river front.

"The existence of a second vein, which is, as near as can be ascertained, about 30 feet below the one working now, is a matter of development.

"The coal can be placed at Little Rock for 13 cents a bushel, or \$3.25 a ton; at the mouth of the Arkansas River for 15 cents a bushel, or \$3.75 a ton; at New Orleans for 20 cents a bushel, or \$5 a ton.

The only coal to compete with on the lower Mississippi—from the mouth of the Arkansas to New Orleans, 600 miles, which section of country consumes about one million of tons per annum—is the Bituminous coal, principally furnished by Pittsburgh.

Professor Owen gives an analysis of the coal in the First Geological Report on Arkansas, page 130. It was also analysed by Mr. I. A. Liebig, and by L. C. Bierwirth, with the following results :

	OWEN.	LIEBIG.	BIERWIRTH.
Moisture.....	0.5	1.524	0.680
Volatile and combustible gases.....	7.9	7.527	10.521
Fixed carbon.....	85.6	85.081	83.719
Ashes.....	6.0	5.468	5.080
Total.....	100.	100.	100.
Specific gravity.....	1.335	1.3408	1.3112

The amount of fixed carbon in the Pennsylvania anthracite is given by Professor Johnson as 87.45, ashes 7.37, and specific gravity 1.60. The average of the three analyses of Spadra coal given above is 84.8 per cent. of fixed carbon.

## PROVIDENCE, RHODE ISLAND.

The receipts of coal at this city during 1872 amounted to 633,452 tons; in 1873, 642,581 tons; in 1874, 656,340 tons.



## COAL IN COLORADO.

The area of land known to be rich in coal deposits in Colorado is about 7,200 square miles, lying in various parts of the Territory, on both sides of the main range. There can hardly be a doubt but that this extent will be largely increased in years to come, for new discoveries are constantly being made upon the foot-hills and plains.

Separated under heads depending more upon their geographical position than upon the character of the fuel, we find :

1. The northern mines.
2. The eastern foot-hill mines.
3. The southern mines.
4. The Summit county mines.
5. The Conejos county mines.

Of the first but little is known. Weld and Larimer counties are undoubtedly underlain by veins of lignite similar to those of Wyoming, which are at present furnishing an excellent fuel for steam engines, domestic purposes, and for some metallurgical processes. Coke made from the product of the Wyoming coal fields has been tried at both Golden and Denver for smelting silver and gold ores, and though discarded in favor of Pennsylvania coke, is considered to be a fair fuel.

The eastern foot-hill mines embrace outcroppings in Boulder and Jefferson counties, nearly all of which have been known since the early days. They are producing at present three-fifths of all the coal mined in Colorado, which is about 120,000 tons, being located nearer the centre of population than any of the other fields.

The main workings lie mostly upon the north side of Ralston Creek, which has cut through the bed and exposed its outcroppings very markedly on either side. Nearly 2,000 feet of the vein is opened. The coal is a very good sample of the product of all the foot-hill mines. It is an altered lignite that burns freely, and crumbles quickly on exposure to the rain or moist air ; burns well under the boiler and in the grate, and answers excellently for nearly all the uses to which mineral fuel is put.

The following is an analysis made in 1871, by E. W. Rollins, of the Massachusetts Institute of Technology, Boston :

Hydrogen.....	4.00 per cent.
Carbon.....	68.50 per cent.
Ash.....	7.05 per cent.
Oxygen, Nitrogen and Sulphur.....	22.45 per cent.

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100.00

East of Denver, along the line of the Kansas Pacific, indications of coal are not wanting. The same formation that is found along the foot-hills, tilted up in a nearly vertical position, underlies the whole of eastern Colorado, which is one vast lignite basin, containing stores of this truly precious mineral.

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The southern mines embrace those of Trinidad and Fremont county, and furnish a class of mineral entirely different from any yet found in the Territory. The latter are the oldest mines and the best known, and the demand for it is great, not only for household use, but for the manufacture of gas in Denver.

The Summit county mines are not worked, as they have only lately been brought into notice. They are located on the divide between the Bear and White Rivers, and consist of several seams varying from five to fifteen feet in thickness, which owing to the contorted strata, lie in a variety of positions, from a strict horizontal to a perfect perpendicular. Above is a stratum of sandstone varying from one to three hundred feet in thickness. The coal is of two kinds, one a hard lignite and the other similar to what is called albertite.

The Conejos beds are also new discoveries of which but little is known. Sufficient outcroppings of coal, however, have been noticed below, and west of Las Animas or Elbert, to indicate the existence of extensive lignite deposits there. The mines are hardly opened yet, but situated as they are, not more than thirty miles south of the centre of the San Juan gold and silver district, it will be but a short time before their product will be called for, should they prove at all suitable for metallurgical purposes.—*Colorado Mining Review.*

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### ASPHALTUM DEPOSITS.

Asphalt is a natural mineral bitumen, and is composed of asphaltene and petroleum. In nature it is found combined with carbonate of lime and other mineral substances. It fuses only at about 400 degrees Fahrenheit, and maintains its hardness under a constant heat of 150 degrees Fahrenheit. This substance was formerly obtained almost solely from the neighborhood of the Dead Sea, but within five years, the great lake of asphalt in the Island of Trinidad has been used as a source of supply both for the United States and Europe. This lake is one of the most remarkable natural curiosities in the world, and its existence has never been satisfactorily explained. It is circular in shape, and covers about 114 acres. Its depth is unknown, although it is estimated to be 800 feet.

The asphaltum constantly bubbles up in the centre, and flows outward. On the outer edges it hardens, and it will sustain carts and teams 200 or 300 feet from the shore. It is cut out in blocks, refined by heat, and finds its way to market molded into barrels. For paving city streets, asphalt is fast coming into general use in Europe. In Paris, all the boulevards and other principal streets are paved with it, and in London no other material is now allowed to be used for laying pavements.

## COAL IN ILLINOIS.

The valuable features of the Illinois coal are, that there is plenty of it, that it is very widely distributed over the State, and accessible. Although it is necessary to mine it by means of shafts in almost all cases, yet the coal is reached at a reasonable depth from the surface; its mining is done without unusual expense; the great number of railroads in all parts of this prairie State, with good level grades, and without curves, furnish an abundance of cheap transportation; and, poor as the coal is, there is a large market for it, for the want of better.

Nothing is too good for our Western people, cost what it may; and then, the poor man's coal is their own Illinois Bituminous, which is brought by rail from the northern limits of their coal field, about sixty miles south of Chicago, and sold, uncleansed of sulphur and slate, in considerable quantities to those who cannot afford the better qualities. Large quantities of the Pennsylvania and Ohio coals received at Chicago are afterward shipped in all directions by rail, as far west as Omaha and to the southern interior of Illinois. In localities too remote to obtain these, their own coal is extensively mined, and used for domestic purposes.

Probably the best coal of Illinois may not yet have been developed. The valuable iron-smelting Big Muddy coal, found in the southern part of the State, and extensively used at St. Louis, as well as some of a fair quality in other localities, gives us ground for hope of yet finding coal of a better quality than much of that which is now mined. The wide distribution and vast extent of the Illinois coal field are truly wonderful; it is as inexhaustible as the soil of her fertile prairies.

The United States census of 1870 reports the production of coal in Illinois at 2,629,563 tons. To those accustomed to the large production of Eastern mines near our seaboard these figures may appear small, but it should be considered that this is but the infancy of the coal business in the West.

In La Salle County there are three seams of coal, the upper four and a half to five feet thick, the middle usually six feet, and the lower four feet. The most popular in the market is the middle, as it makes a dense fire, and is largely used for steam and domestic uses. In 1870, the product was 173,864 tons. (Census reports.)

What is known as Wilmington coal is found in Will and Livingston Counties, in a seam averaging three feet in thickness. Large quantities are mined, as the last census report shows 228,000 tons from Will County. It makes a good steam coal, and is much liked for locomotive use.

This district furnishes the principal supply of soft coal used in Chi-



cago. It is mined by three companies—the Wilmington and Vermilion, Wilmington Star, and Wilmington Coal and Manufacturing Companies. The first of these companies has three shafts, with a capacity of 600 tons a day each. The Star Company has two shafts on the line of the Chicago and Alton Railroad and one on the Chicago and Illinois River Railroad, with a total capacity of 1,000 tons a day. They shipped about 60,000 tons in 1874.

The Wilmington Coal and Manufacturing Company own 1,000 acres of land and run two shafts, with a producing capacity of over 500 tons daily. The opening of the Chicago and Illinois River Railroad, which pierces the heart of this coal district, will furnish Chicago with a supply of cheap and valuable fuel.

St. Louis, Missouri, obtains a large supply of Bituminous coal from the Belleville district, in St. Clair County, Illinois. This county contains 450 square miles of coal, and the last census returns show a production in this county of 793,810 tons.

The principal seam worked is from five to seven feet in thickness, and is economically worked. Analysis of this coal shows: Water, 6; volatile matter, 33.8; fixed carbon, 55.2; ash, 5.

Professor Worthen says: "This coal compares favorably with the average Bituminous coals of this or adjoining States."

Danville and Catlin, in Vermilion County, produced 115,640 tons in 1870. The seam is six feet thick, furnishing a good fat, soft caking coal. The vein is from seventy to one hundred feet below the surface, and is very thick and of excellent quality. Mining was begun in 1867, and to provide an outlet for the coal, a railway was built to Wenona, on the Illinois Central road; a second outlet by rail is by the way of Ottawa to Aurora, known as the Fox River Valley branch of the Chicago, Burlington and Quincy road; a third outlet is a branch of the Chicago and Alton road, connecting Streator with Dwight; a fourth outlet is to Pontiac and Fairbury, on what is known as the Chicago and Paducah road; the fifth is the Chicago, Pekin and Southwestern road; and the sixth and last is from this point to Chicago, via Joliet.

The production of coal in 1873 is estimated at 3,500,000 tons.

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## COAL IN INDIANA.

The area of the Indiana coal measures approximates one fifth of the entire State, and embraces the Counties of Perry, Spencer, Warwick, Posey, Vanderburg, Gibson, Pike, Dubois, Daviess, Knox, Martin, Sullivan, Greene, Clay, Vigo, Parke, Vermilion and Fountain. The most important coals, from a manufacturing point of view, are those known as

the "lower block 3.8 thick, the "main block" 4.4 thick, and "upper block" 1.10 thick. Block coal has a laminated structure, and is composed of alternate thin layers of vitreous dull black coal and fibrous mineral charcoal. It splits readily into sheets, breaking with difficulty in the opposite direction; on burning, it scarcely swells, or changes form, and never cakes or runs together. What the celebrated English chemist, Mushet, said about a certain Welsh coal, is equally applicable to the block coal of Indiana. To the purity of splint coal it unites all the softness and combustibility of wood, and the effects produced by it in the blast furnace, either as to the quality or quantity of iron, far exceed everything in the manufacture of that metal with charcoal. From careful assays, it is ascertained that this coal gives from 56 to 62 per cent of fixed carbon, a small amount of water and a small amount of ash. Dr. E. T. Cox, the State geologist, gives this coal an exceptional character as an iron smelting fuel, and reports a ton of pig iron as being made with 4,250 pounds of block coal.

The following elementary analyses of five block coals from Clay County are of interest in this connection :

Location.	Carbon.	Volatile Matter.	Ash.	Sulphur.
Garlick & Collins, Brazil Furnace..	76.81	18.81	3.88	.50
Garlick & Collins, Brazil Furnace..	82.70	15.78	1.07	.45
Star Mine, Planet Furnace. ....	80.74	15.80	2.74	.72
Star Mine, Planet Furnace. ....	81.69	14.94	2.74	.72
Clay Coal Company's mine. ....	84.68	13.14	1.68	.50

The coal in this district is favorably known as an iron-smelting fuel, and we append a description of its qualities.

There are two veins of coal, the upper vein averaging about three feet ten inches in thickness and the lower one averaging about four feet. The roof is principally sand rock, slate, and slate and sand rock mixed. Fire and potters' clay of good quality underlie the coal. The average depth to the first vein is about forty-five feet from the surface, and the second or lower vein is found at an average depth of seventy-five to eighty feet. The coal is free from slate and sulphur. It burns freely, and leaves a soft, fine white ash, similar to wood ash, and no clinkers. For domestic and steam purposes, this coal is largely used in Chicago, Ill.; Indianapolis, Ind.; Kalamazoo, Mich.; and the towns and stations along the lines of most of the railroads leading from this coal district, among which may be mentioned the St. Louis, Vandalia, Terre Haute and Indianapolis Railroad; the Jeffersonville, Madison and Indianapolis Railroad; the Indianapolis and St. Louis Railroad; the Louisville, New Albany and Chicago Railroad; the Cincinnati, Lafayette and Chicago Railroad; the Lake Shore and Michigan Southern Railroad; and the Michigan Central Railroad.

In the block coal zone of the Indiana coal fields there are as many as eight seams of non-caking coal, four of which are of good workable thickness over a portion of the field. These are I, G, F and A, which, together, have a maximum thickness of fifteen feet; and by including the other four seams, we have six feet more, making a total of twenty-one feet of block coal. If we take one half of this as a moderate average over the 288,000 acres, it gives us 5,269,017,600 tons of coal adapted to the smelting of iron.

The coal of Parke County is favorably reported on for the manufacture of iron. It is a block coal, averaging five feet in thickness, weighing seventy-seven pounds to the cubic foot, and gives by analysis 62.5 fixed carbon, 31.00 volatile matter, 4.05 water, and 2 per cent of ash. The estimated area is about 300 square miles of workable coal.

The "upper block" at Washington, in Daviess County, is extensively mined, and meets with a ready market at St. Louis, and all the towns on the Ohio and Mississippi Railroad. Its specific gravity is 1.294; a cubic foot weighs 80.87 pounds; by analysis it yields: fixed carbon, 60.00; ash, 4.50; volatile matter, 35.50. The coal worked is known as L, a five foot seam of Bituminous, an excellent caking coal, free from impurities, and may be handled and stocked without much loss; it has been used for gas making at St. Louis, and is a three foot ten inch seam of very pure coal, jet black, of cubical fracture, and bears a good reputation as a fuel general uses.

The census report for 1870 shows the product of coal for the year 1869 to have been 437,870 tons, of which 236,642 tons were from Clay County and 64,330 from Daviess. The output for the year 1873 is estimated at 1,500,000 for the whole State of Indiana.

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## COAL IN ALABAMA.

There are only two distinct coal formations in Alabama, the Coosa being a continuation of the Cahaba; originally the Warrior and Cahaba were one and the same, but became separated by the Silurian strata being thrown up between them, and they now form two fields.

On the Selma, Rome and Dalton Railroad, at a point fifty-five miles from Selma, a branch railroad, two and a half miles long, runs to two openings on coal seam numbered "8," on Section No. 1. The coal averages from two feet six inches to four feet in thickness, is very hard, Semi-bituminous, red ash, free burning, non-coking, and a good household fuel. Being above water level, no machinery for either hoisting or pumping is required. The price paid for mining is one dollar and a half



per ton, and the coal is blasted out of the solid. The coal sells in the cars at from three dollars and a half to four dollars and a half a ton.

Another opening is worked on the same seam by the Central Mining Company. The coal averages from twenty-two inches to three feet in thickness, is hard, Semi-bituminous, free burning, non-coking, red ash, free from sulphur, burns to an impalpable ash, leaving no cinder or clinker, and is as good a steam coal as any in the United States.

Both of these mines were opened during the late war, but it was not until 1867 and 1868 that the Central Mining Company sank a slope below water level and introduced machinery. The slope is 600 feet deep, and in the coal, and dips with a descent of one foot in nine north, two degrees east, the strike being northeast and southwest. The present mode of mining is longwall advancing. The coal is hoisted by a double cylinder engine of forty horse power, placed underground, ninety feet vertical from the surface, and the smoke from the boiler is conveyed up a shaft. The water is raised by a steam pump.

The principal market for these coals is the City of Selma, for household use, high freights on the railroad preventing its reaching distant points. The true destination for this coal would be one of the Gulf ports, say Pensacola, distant from Montevallo 270 miles, to be sold as a steam coal for marine purposes; and when Southern railroads learn that it is to their interest to have cheap coal freights, it will be carried there.

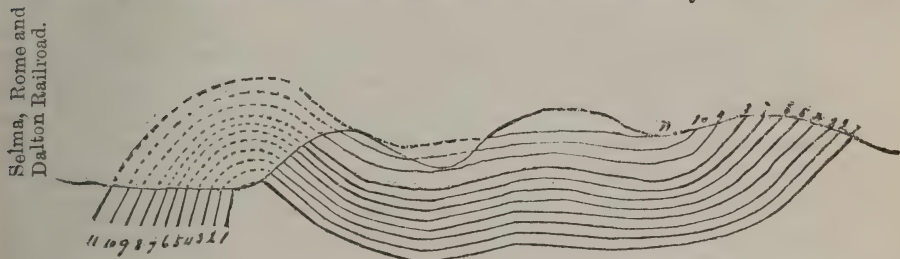
At Calera, seven miles northeast of Montevallo, the Selma, Rome and Dalton Railroad is crossed by the South and North Railroad, a continuation of the Louisville and Nashville Railroad to Montgomery. On this road, seventeen miles north of Calera, the Cahaba coal field is again reached at Helena Station. Several companies are working on a small scale, and are drifting above water level, with the exception of the Cahaba Coal Company, who have a slope sunk in the coal 175 feet on seam No. 9. All of these workings are on the northern dip of the coal, and the average thickness and quality of the coal is shown on section No. 2.

Crossing the Cahaba River, we find we have passed over the coal basin, and the coal now dips south. No. 9, on southern dip, worked by Messrs. Davis & Company, is the same seam worked by the Cahaba Coal Company, but on opposite dip, and is here worked above water level. The coal is a coking coal of third or fourth rate quality, not very free-burning, and averages from two feet six inches to three feet thick. The next seam that is opened is on No. 6, on section No. 2, also above water level, and a most excellent coal for blacksmiths' use and for making coke, but is far too friable for either steamer or household use. This coal is so soft, that it is mined for seventy-five cents a ton, all the other coals in the neighborhood having to pay from one dollar to one dollar and a

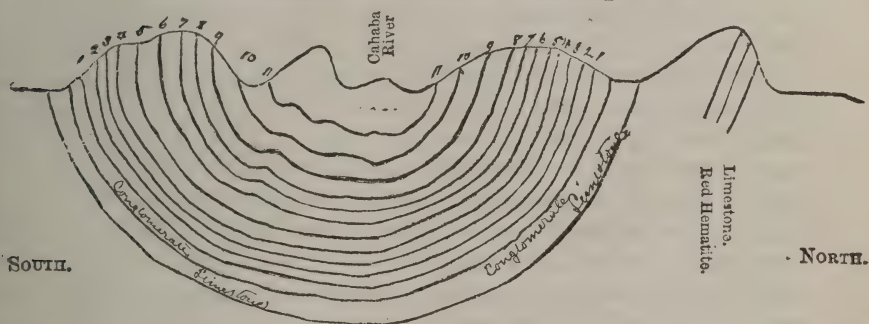
quarter a ton. This coal averages from four to five feet in thickness, and is three quarters of a mile from the railroad, to which it is transported over a tram road. The others are immediately upon the railroad.

In the Warrior field developments have been made sufficient to show six workable seams of coal, many of which are coking, varying from two and a half feet to seven feet in thickness. The dip is slight compared with that of Cahaba, although the quality is not quite equal to some of the seams in the latter formation, most of the Warrior containing small bands of shale. One of the upper series has been struck with the diamond drill, showing eight feet of coal, free from slate and a good coking coal.

Sales of Alabama coal for the last year did not exceed sixty thousand tons.



Section No. 1.—Through centre of Cahaba Coal Field, from Selma, Rome and Dalton Railroad to Alabama and Chattanooga Railroad.



Section No. 2, on South and North Railroad. From Helena, North towards Birmingham.

Seam No. 1, on Northern dip, three to four feet in thickness, non coking.

Seam No. 2, " " " "

Seam No. 3, " " " "

Seam No. 4, " " " "

Seam No. 5, not developed.

Seam No 6, on Southern dip by Glasgow Coal Co., excellent coking coal, 5 feet thick.

Seam No. 7, not developed.

Seam No. 8, not developed.

Seam No. 9, on Northern dip by Cahaba Coal Co., on Southern dip by Davis & Co., coking coal, 2 ft. 6 in. to 3 ft. in thickness.

Seam No. 10, not developed.

Seam No. 11, not developed.

## COAL IN MISSOURI.

[From the Report of G. C. Brodhead, State Geologist, for 1874.]

The coal measures of Missouri comprise an area of about 22,995 square miles, including 160 square miles in St. Louis county, 80 in St. Charles, and a few outliers in Lincoln and Warren; the remainder in North-west and Western Missouri.

This includes 8,406 square miles of upper or barren measures, about 2,000 square miles of exposed middle, and 12,420 of lower measures.

## BOUNDARY.

The boundary between the upper and middle coal measures I have elsewhere defined. It will be found delineated on the map. The boundary between the middle and lower coal is not well defined, but is limited by a thick-bedded, coarse, micaceous sandstone, sometimes of no great extent, at other times of great thickness. We suppose it to enter the State in the west part of Bates county, and to pass thence via Butler to Chilhomee in Johnson county; thence northwardly four miles west of Warrensburgh to four miles east of (?) Aullville, Lafayette county; thence, irregularly meandering through Lafayette county, crossing the Missouri river, passing to ten miles east of Carrollton, Carroll county; thence to the south-east corner of Livingston county, from which point it bears north-east to the center of Linn county, and thence, northward. The southern and eastern boundary of the lower coal measures is as follows: (through Barton, Bates, Vernon and St. Clair, the boundary has not yet been well defined;) entering the State in Barton, it passes north-east through the eastern part of Vernon; it enters St. Clair about one-half way up, on its western line, thence, meanders eastward to a point a few miles north of Osceola; thence, northward to within eight miles of Clinton, Henry county, thence north east to the east line of Henry county; thence, northwardly, with occasional variations of sandstones as much as eight miles east to Brownsville, Saline county; thence, north-eastward to Marshall, and thence to Miami. On the north side of the river it passes eastward, from a point opposite Arrow Rock, to the east line of Howard county; and thence, in a meandering course via Columbia, Boone county, New Bloomfield and Fulton, Callaway county, to the north-east corner of Callaway; thence, north-eastwardly to a point three miles west of the north-east corner of Montgomery county; thence, north-west to near the mouth of Lick creek, Ralls county; thence, south-west to Mexico, Audrain county; from thence, to the north-west corner of Monroe county, thence, irregularly trending northward, to the north-west corner of Knox county; thence, to a point on the north line of Lewis county, about 12 miles west.



of the Mississippi river; thence northwardly to the Des Moines river, on the north line of the State of Missouri.

East of this, are small outliers in Montgomery, Warren, Lincoln and St. Louis counties, and perhaps others in South-west Missouri.

#### THICKNESS.

The aggregate thickness of the upper coal measures is 1,317 feet, including only about 4 feet of coal, of which there are two seams of one foot in thickness; the others are very thin seams or mere streaks. The middle coal measures include a total thickness of about 324 feet, in which are embraced about 7 feet of coal, including two workable seams of 21 and 24 inches; one other of 1 foot, that is worked under favorable circumstances, and six seams too thin to work. The lower measures include from 250 to 300 feet, embracing about five workable seams of coal, varying in thickness from  $1\frac{1}{2}$  to  $4\frac{1}{2}$  feet, and thin seams varying from 6 to 11 inches, and several minor seams and streaks; in all 13 feet 6 inches of coal. We therefore have in Missouri nearly 1,900 feet of coal measures with a total aggregate of 24 feet 6 inches of coal. The thinner seams of coal are not often mined, except in localities remote from railroad transportation. The coal from thicker seams (those from  $1\frac{1}{2}$  to 2 and 4 feet) is generally sold at 10 cents per bushel at the mines.

The thin seam, 10 to 14 inches on Nodaway river, is sold at over 20 cents per bushel at the mines. The reason of this is the difficulty of mining (there being so much superfluous material to be removed) and the remoteness of other coals.

Miners seem to prefer to work a bed of 2 to  $2\frac{1}{2}$  feet in thickness. We would consider all beds over 18 inches thick as workable coals. The estimated area, where such may be reached within 200 feet from the surface, is about 7,000 square miles.

The following is a condensed vertical section of the coal measures:

No.	Locality.
1—339 feet, including 230 feet above the connected section.....	
2—12 inches coal.....	Holt, west part of Nodaway and northwardly; also White Cloud, Kansas.
3—392 feet.....	
4—12 inches coal.....	Andrew, Buchanan, De Kalb, Gentry and Platte.
5—207 feet.....	
6—10 inches coal.....	Platte county.
7—379 feet to base of upper coal measures.....	

No.	Locality.
8—3 inches coal at top of middle coal measures.....	Pleasant Hill, Missouri City and Princeton, Mercer county.
9—164 feet.....	
10—1 foot coal.....	Cass, Johnson, Lafayette and Livingston, also Grundy.
11—70 feet.....	
12—22 feet (Lexington coal).....	Lafayette, Johnson and Ray.
13—36 feet.....	
14—7 inches coal.....	Lafayette and Ray.
15—14 feet.....	
16—21 inches coal.....	Lafayette, Johnson, Carroll and Livingston.
17—50 to 90 feet.....	
18—1½ foot (Warrensburgh coal).....	Johnson, Henry and Chariton.
19—52 feet.....	
20—7 inches coal.....	Johnson.
21—18 feet.....	
22—1 foot 8 inches coal.....	Johnson.
23—18 feet.....	
24—8 inches coal.....	Johnson.
25—4 feet.....	
26—2 feet coal.....	Henry.
27—48 feet.....	
28—2½ feet to 4 feet 5 inches coal.....	Randolph, Boone, Callaway, Johnson, Henry, Vernon, Bates, Adair, Sullivan, Putnam, Audrain and Macon.
29—11 feet.....	Macon.
30—11 inches coal.....	Macon, Henry and Johnson.
31—About 13 feet.....	
32—2 feet coal; 10 inches of clay near base.....	Ralls, Audrain, St. Louis, St. Charles and Montgomery, Henry and Johnson.

### COAL IN OHIO.

The coal measures within this State occupy a space of about 180 miles in length by 80 in breadth at the widest part, with an area of about 10,000 square miles, extending along the Ohio river from Trumbull county, on the north, to near the mouth of the Scioto, on the south. The regularity of the dip and the moderate inclination afford facilities to the miner not known to those of most other countries.

The counties wholly underlain with coal are Mahoning, Columbiana, Stark, Holmes, Tuscarawas, Carroll, Jefferson, Harrison, Belmont, Guernsey, Coshocton, Muskingum, Perry, Noble, Morgan, Monroe, Washington, Athens, Miegs, Galla, Lawrence, and nearly all of Jackson. The counties of which the eastern or south-eastern parts only are underlain

with coal are Trumbull, Summit, Medina, Wayne, Licking, Fairfield, Hocking, Vinton, and Scioto. There are small detached basins in Wayne, Ashland, Richland, and Knox counties. The boundary on the east is the State line, the same field extending eastward over all Western Pennsylvania.

Prof. J. S. Newberry divides the coals of Ohio into three classes: first, the dry, open-burning or furnace coals; second, cementing or coking coals; third, cannel coals. The first, which is popularly known as block coal, includes those that do not coke and adhere in the furnace, and are such as may be used in the raw state for the manufacture of iron. The second, embracing by far the greater portion, are of the ordinary coking, bituminous kinds, which to a greater or less degree melt and agglutinate by heat. The third variety consists of the cannel coals, which resemble a dark shale, highly impregnated with bitumen, and burns with a bright flame, but does not agglutinate.

The Commissioner of Statistics gives the following tonnages, but expresses the opinion that they are far below the correct figures:

Year.	Tons.	Year.	Tons.
1863.....	1,075,519	1869.....	2,198,202
1864.....	1,621,091	1870.....	2,527,285
1865.....	1,371,614	1871.....	3,000,000
1866.....	1,685,200	1872.....	4,309,112
1867.....	1,868,155	1873.....	3,944,340
1868.....	2,210,575	1874.....	3,500,000

The panic of 1873 affected the coal trade of Ohio very materially.

The chief mining regions of Ohio are the Mahoning Valley, the Tuscarawas Valley, the Hocking Valley, including the Straitsville and Shawnee mines, the Salineville region, the Pomeroy region, the Bellaire region, the Steubenville region, the Jackson region, the Cambridge region, the Coshocton region, the Leetonia region, and the Iron-ton region.

The Mahoning Valley has 40 mines and employs 3,500 men and boys underground, capacity, say 1,550,000 tons a year. The Tuscarawas Valley has 34 mines, and employs 3,000 men and boys in the mines, capacity 1,250,000 tons. The Hocking Valley, including Straitsville and Shawnee, has 50 mines, and employs 2,500 miners, capacity 1,000,000 tons. Salineville, including Irondale, Hammondville and Vellan Creek, 25 mines, employing—when running full time—about 1,000 miners, raising 500,000 tons. Pomeroy, including Leadington Creek, 16 mines, employing 800 miners, and produces 400,000 tons yearly. Bellaire, including the region round about, has about 15 mines and 500 miners, capable of raising 250,000 tons. Steubenville and other mines, 14 mines and 500



miners, capacity 250,000 tons. Jackson, 20 mines and 300 miners, raising 150,000 tons. Cambridge, including Zanesville and vicinity, 25 mines and 300 miners, raising 150,000 tons. Coshocton, including mines on Pan Handle Railroad, has 16 mines and 300 miners, raising 100,000 tons. Leetonia, including Alliance, 10 mines and 250 miners, raising 100,000 tons. Ironton, 8 mines and 200 miners, raising 80,000 tons annually.

In addition to the force of men and boys employed in mining there are trapper boys, driver boys, track layers, road men, etc., in every mine, aggregating 4,000 more. The whole underground force of Ohio is estimated at 18,000 men and boys, the number of mines at 300.

The mines of Mahoning Valley, the Tuscarawas Valley, and the Jackson region are all opened on the lower coal of the measures, called Briar Hill coal, Black coal, furnace coal, etc. It is usually about four feet thick. The mines of Hocking region, Steubenville, part of Salineville, Cambridge, are opened on No. 6, which ranges from 4 to 13 feet of thickness and is open burning in quality also. The others are worked in each of the different beds, of which there are ten altogether of minable thickness.

The amount of available coal in the State is estimated at 83,733,333,333 tons, of which one-third may be deducted for crushed and lost pillars, and slack made in digging and screening.

The chemical analysis of the Ohio coals shows that the relative amount of moisture varies from 1.10 per cent to 9.10 per cent. The amount of volatile matter varies from 28 per cent to something over 40 per cent. Fixed carbon varied from 34.10 (in the upper coal from Holmes county) to 65.90 (in the coal from Steubenville shaft). The ash found in eleven Ohio cannel coals was 12.827 per cent. The average proportion of sulphur was 1.551 per cent, that from the lower half of the State being 1.229 percent, and that of the coal from the upper half 1.836 per cent.

Coal was discovered in Tallmadge, a mile west of the Centre, as early as 1810. It was visible in a small ravine, where for many years blacksmiths from the adjacent country came and dug it from an open pit. At that time no other coal was known in Northern Ohio. As early as 1755, mineral coal had been discovered near Bolivar, in Tuscarawas county, by its being seen on fire, but it was not dug or mined for use as fuel, in this part of the State, prior to 1810. The seam was 4 feet thick, and was regularly mined in 1820.

The Perry county coal field is new, dating back only to 1870; yet the seven mines at Straitsville take out as much coal daily, as the whole of Hickory township combined. This coal is of about the same character as the block coal of Mercer, Trumbull, Mahoning and other adjoining coun-

ties, is 11 feet thick, although there are two other veins, one under and one above the "great vein," aggregating another 11 feet, making in all 22 feet of coal in three veins, in the same hill, all above the water level.

Cleveland and Erie have hitherto had a monopoly of the trade by lake, but it will soon embrace several other lake towns. Toledo, Sandusky, Black River, Fairport, and Ashtabula have roads leading to the mines, the principal object of which is to bring out coal.

An analysis of the block coals of the Mahoning Valley gave the following results:

	I.	II.	III.
Specific Gravity.....	1.281	1.260	1.323
Water.....	3.60	2.47	3.90
Volatile Matter.....	32.58	31.83	29.70
Fixed Carbon.....	62.66	64.25	60.40
Ash.....	1.16	1.45	6.60
	100.—	100.—	100.—

No. 1—Sample of Briar Hill, from Chestnut Ridge.

No. 2—From Vratich's mine, Youngstown.

No. 3—From Walworth's mine, Mahoning county.

## WEST VIRGINIA.

The coal measures of West Virginia underlay nearly 16,000 square miles of territory, of which, what is known is the Kanawha and New River Valleys hold eight thousand.

Prof. W. B. Rogers pronounced this the most remarkable deposit in the United States, and Prof. Ansted, the English geologist, estimates the deposits at 55,000 tons of coal per acre.

Three varieties of coal occur: cannel, splint, and bituminous. Of the bituminous there are seams of different degrees of hardness and texture, from the friable coking coal, similar to the best of the Newcastle (England) coals, to the harder splint coals, with regular cleavage, similar to the Youghiogheny coals so largely in demand in our Western and Southern cities; of so compact a nature that it can be used in an iron blast furnace in its raw state.

The bituminous coals are excellent steam-raising fuels, and have been used in steamers, railways, and under stationary engines with good results.

The gas coal seam is identical with the Kittaning coal bed, mined on the Allegheny river, in Pennsylvania.

# SECTION OF THE KANAWHA COAL MEASURES.

MADE BY PROFESSOR D. T. ANSTED.

*p*—Cannel seam. *o*—A seam overlying the flint vein. *n*—The flint vein. *m*—A seven foot seam. *l*, *k*—Two thin, worthless seams. *i*—Eleven feet bed of part Splint, part Bituminous. *h*—Fine Cannel and Bituminous. *g*—Appears part Cannel, part Bituminous. *f*—A good, six feet seam, Bituminous. *e*—A poor seam, Bituminous. *d*—A fair seam of Bituminous, about 20 feet below. *a*, *b*, *c*—A group of three beds, workable from same drift, about 9 feet of coal, Bituminous. A, B—Two six to seven feet seams of Bituminous coal.

[All above water-level.]

*p* 7.6'  
*o* 5.6  
*n* 7.0  
*l* 2.6  
*k* 3.0  
*i* 11.0  
*h* 3.6  
*g* 4.0  
*f* 6.0  
*e* 2.6  
*d* 3.6  
*c* 2.6  
*b* 2.6  
*a* 4.0  
A 6.6  
B 6.6



On approaching from the eastward, the bituminous coal seams of West Virginia are first found in the tops of the mountain ranges overlooking New river, in Summers and Raleigh counties, embracing only the lowest seams of what are known as the lower coal measures.

The Big Sewell mountain, a prominent elevation in West Virginia, towering some 2,800 feet above sea level, and 1,500 feet above New river, forms the south-eastern edge of the "Upper Ohio coal basin."

All the territory drained by the Kanawha and its tributaries, between the Falls of the Kanawha and Campbell's creek, contains the seams of coal within workable reach, above water level, or by shafts at no great depth. It can be mined very cheaply, and the quantity available is vast beyond conception.

The top seam of the lower coal measures disappears beneath the Kanawha, at its confluence with the Elk river, at Charleston; while some of the coal seams reappear up the valleys formed by the Elk and Coal rivers.

Cabin creek, Elk river, and Coal river are three considerable tributaries to the Kanawha, penetrating the country for a long distance, and bringing into convenient working position thousands of acres of valuable coal land. The two latter are partly navigable, but there cannot be a doubt that before long all of them will be supplied with roads, by which the coal will be brought into the market. They lay bare some of the finest deposits of cannel coal in America.

At Quinnimont, 235 miles west from Richmond, are the works of the Quinnimont Co.; we give the result of tests made by J. B. Britton:

Coal.		Coke run of mines.		Coke from slack.
Fixed Carbon.....	75.89	Carbon.....	93.85	91.72
Volatile Matter.....	18.19	Ash.....	5.84	5.09
Ash.....	4.98	Sulphur.....	0.31	0.48
Moisture.....	0.74	Water.....	—	2.71

This company is working a vein about  $3\frac{1}{2}$  feet bituminous coal, using the coke in their furnace.

At Hawks Nest, 325 miles west from Richmond, are the works of the Gauley-Kanawha Co., an English concern; they are working a nine-foot vein of bituminous coal, divided into five parts by four slate partings from three to ten inches. Their coal was analyzed at the School of Mines, in London, with the following result: Carbon, 83.31; hydrogen, 5.54; oxygen and nitrogen, 6.86; sulphur, 0.74; ash, 2.15; water, 1.40.

At Cannelton, 344 miles west from Richmond, the Cannelton company are working the coal, which is so well known in the Eastern and Western markets. At this point there are the following seams of coal: The first, known as the "Smithers Creek," 4 feet 9 inches in thickness (two bench-

es of coal separated by 4 inches of slate). Next above is the gas coal, of 6 feet 8 inches, made up of three benches; the coal is a first-class gas coal. Above this is a seam of coal 5 feet in thickness, of semi-bituminous quality. Above this is the "Stockton" seam of coal, 5 feet 4 inches in thickness, averaging  $3\frac{1}{2}$  feet of cannel, and 1 foot 10 inches of splint coal. Next above is a seam of "Splint" coal, 8 feet in thickness, 6 feet of which is a solid mass, and an excellent coal for smelting purposes.

We give an analysis of the Cannelton, made by the Manhattan Gas Light Co., of New York: Volatile matter, 58.0; fixed carbon, 23.5; ash, 18.5. At standard (10,000 cubic feet) it gave an illuminating power of 64.54 candles, or 12,025 cubic feet of 45.60 candles. Weight of 32 bushels of coke, 1320 pounds.

In the vicinity of Coalburg, 354 miles west from Richmond, are several operations, working coal which is highly appreciated by iron-masters as an excellent fuel, in its raw state, in the reduction of iron ores, and also for steam and domestic purposes in the Cincinnati market. We are also informed that gas and house coals are being developed, which are of superior quality. Analyses made of bituminous from this locality show: Fixed carbon, 56.0 to 62.6; volatile matter, 40.5 to 33.3; ash, 1.5 to 1.8; water, 2.0 to 2.5.

At Peytona, in Boone county, are the mines of the Peytona Cannel Coal Co., located on Coal river, about 35 miles from its junction with the Great Kanawha river, 380 miles west from Richmond. The coal is transported by slack water navigation to the mouth of Coal river, where a connection is made with the C. & O. R. R.

The greatest part of the product of these mines has been forwarded westward by the Kanawha and Ohio rivers to Cincinnati, and other important places bordering the rivers. The coal is also sold in the Eastern markets, where it is esteemed both for gas purposes and fuel, being forwarded by the C. & O. R. R.

We give place to an analysis of this coal made by the Manhattan Company: Volatile matter, 46.0; fixed carbon, 41.0; ash, 13.0. At 10,000 feet per ton, standard yield, the illuminating power is 43.12 candles, or 13,200 cubic feet of 32.66 candles. Weight of coke, 32 bushels, 1380 pounds.

In regard to an outlet from this region, we have the Chesapeake and Ohio Railway eastward, the building of which has done so much to open up this district; their charges for carrying coal are about one cent per ton per mile, the published rates from Hawks Nest to Richmond being \$3.25. On the cannel coal the rates are \$5.00 per ton. In addition a charge for shipping at Richmond of 20 cents per ton. Freight from Richmond to New York range from \$1.75 to \$2.25 per ton, according to the season of the year.

## NOVA SCOTIA.

This district is so intimately connected with our Union, that we give it the first place in the record of the sources of coal supply outside of the States.

The yearly business has grown to be nearly one million tons. The exports to the United States are destined principally to the Eastern States, where it enters into competition with Broad Top and Cumberland for steam uses, and our Pennsylvania and West Virginia gas coals in the manufacture of gas.

Nova Scotia coal was admitted into the United States free of duty during the years 1854 to 1865, and the average annual production of those twelve years was only 333,427 tons. A monopoly of these regions was granted to the Duke of York in 1826, but it was relinquished in August, 1857. The production from the commencement in 1827 to 1873, inclusive, amounted to 12,262,140 tons. The most important regions are Pictou, and Sydney or Cape Breton, as will be seen from the tables of the production. New Brunswick possesses a mine of what is called Albertite, a variety of asphalt which yields 100 gallons of crude oil to the ton, or 14,500 cubic feet of gas. It was discovered in 1849. The Pictou field is said to contain some 28 square miles, but the available space for working is much less. The most extensive is the Cape Breton field. It extends about 35 miles along the coast, and ranges from four to five miles in width.

The following is an abstract of the quantity of coal raised and sold in Nova Scotia and Cape Breton Island during the decade ended 31st of December, 1873, as taken from the reports of colliery managers to the Mines Department.

Year.	RAISED.	Cumber- land.	SOLD.	
	Nova Scotia proper and Cape Breton Island.		Pictou.	Cape Breton.
1864.....	562,102	20,612	226,533	339,972
1865.....	715,786	11,865	190,338	424,991
1866.....	664,998	15,038	181,658	360,774
1867.....	517,525	10,066	135,115	326,904
1868.....	462,188	10,104	144,852	298,669
1869.....	578,062	8,515	198,211	305,069
1870.....	625,769	7,884	226,526	333,867
1871.....	673,242	11,737	245,800	338,881
1872.....	880,950	14,153	188,417	333,344
1873.....	1,051,467	26,345	333,984	520,777
Total.....	6,732,689	137,369	1,271,424	3,632,348



The average prices of Nova Scotia coal, delivered at Boston, Mass., together with the amount of Nova Scotia coal received into the whole United States, for the fiscal year ending with June 30th, are stated in the following schedule :

Year.	Price per ton.	Yearly receipts.
1863.....	\$7 40	282,774 tons.
1864.....	10 40	347,594 tons.
1865.....	9 60	465,194 tons.
1866.....	8 54	404,262 tons.
1867.....	8 10	338,452 tons.
1868.....	8 16	228,132 tons.
1869.....	7 78	257,485 tons.
1870.....	6 50	168,180 tons.
1871.....	6 54	165,431 tons.
1872.....	7 00	154,092 tons.
1873.....	7 75	232,419 tons.
1874.....	7 25	263,238 tons.

The following table gives the Gas Values of the best known coals :

Mine.	Seam.	Cubic ft. of gas per ton.	Candle power.	Quality of coke.	Theo. evapora- tive power.
Sydney.	Main Seam.	8,200	8	Good.	8.49
Lingan.	Phelan Seam.	9,700	—	—	9.19
Glance Bay	Harbor Seam.	10,000	16	Good.	7.76
	Hub Seam.	10,000	15	Fair.	8.59
Caledonia.	Phelan Seam.	9,700	16	Average.	7.88
Reserve.	Reserve Seam.	9,000	13	Average.	8.02
Block House.		10,500	14	Good.	7.60
Gowrie.	Mc Aulay.	9,000	15	Good.	7.90

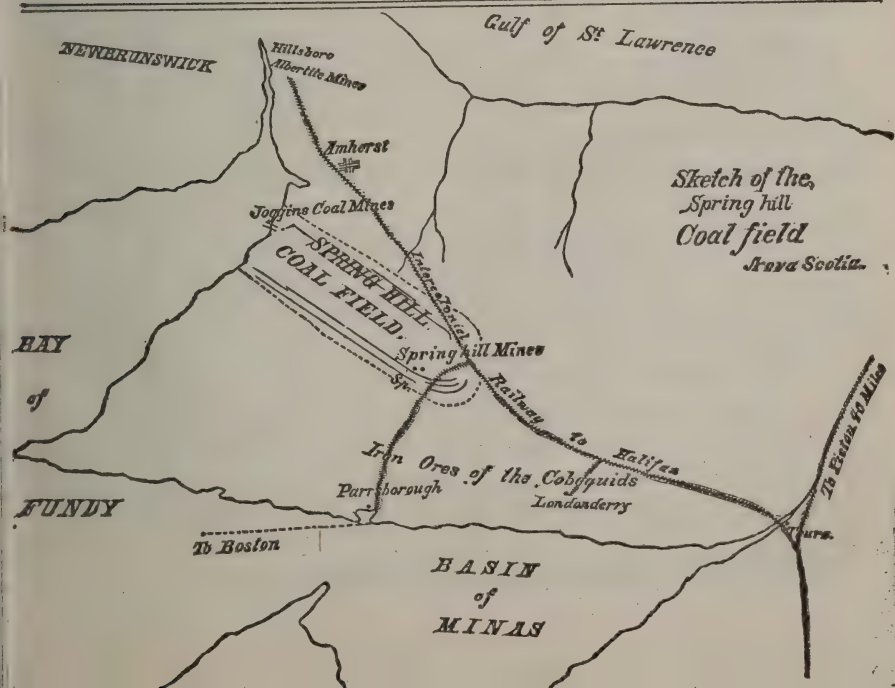
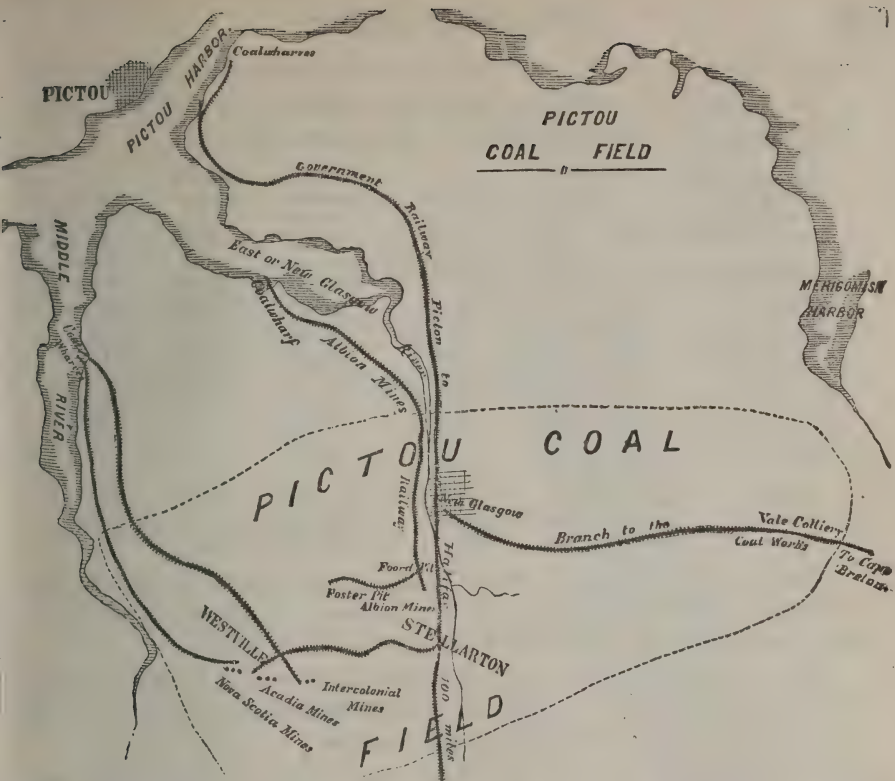
The following table shows the production of coal from 1827 to 1874, inclusive :

1827 to 1830.....	51,172 tons.
1831 to 1840.....	808,145 tons.
1841 to 1850.....	1,405,285 tons.
1851 to 1860.....	2,292,305 tons.
1861 to 1870.....	5,092,587 tons.
Total to 1870 was.....	9,649,470 tons.
For the year 1870.....	625,709 tons.
For the year 1871.....	673,242 tons.
For the year 1872.....	880,950 tons.
For the year 1873.....	1,051,467 tons.
For the year 1874.....	920,000 tons.

During the year 1874, freights and prices ruled particularly low, and the output shows a falling off, owing to the stagnation of trade in the Eastern States, of 130,000 tons.

Coke has not yet been manufactured in this district to any extent, the success attending several practical trials not having been such as to warrant the expenditure of capital.

Coal cutters are paid by the ton, the cubic and lineal yard, the average price being about forty-five to fifty cents per ton, men usually finding powder, oil, etc.



We are enabled to give the sales and shipments of coal from Nova Scotia, together with the destination, by counties, for 1874 :

Markets.	Cumber- land.	Pictou.	Cape Breton.	Other counties.	Total.
Nova Scotia land sales	3,038	42,602	16,006	....	61,646
Nova Scotia sea borne.	941	64,365	85,508	2,475	153,319
Nova Scotia total	3,978	106,997	101,514	2,475	214,965
Quebec	.....	116,188	45,562	619	162,269
New Brunswick	42,453	9,897	26,491	....	78,841
Newfoundland	.....	2,030	52,651	477	41,948
Prince Edward's Island	.....	35,167	6,304	....	138,335
United States	3,167	60,919	74,249	.....	47,844
West Indies	.....	21,362	26,482	....	5,077
South America	.....	4,389	688	....	4,152
Europe	.....	977	3,175	.....	.....
Total	49,599	357,926	337,016	4,586	749,127
Total 1873	26,345	333,984	520,189	588	881,106
Total 1872	14,153	388,417	380,273	3,070	785,914

The above is not the total output of the mines, nor does it include the colliery consumption ; in 1873 this item amounted to 110,341 tons. The stock on hand at the end of 1874 was about 100,000 tons.

The shipments from Pictou County were produced by : Acadia mines, 100,859 tons ; Albion, 110,431 tons ; Intercolonial, 56,214 tons ; Nova Scotia, 51,085 tons ; Vale Colliery, 38,131 tons.

The proportion of round and slack made is shown by the following statement :

Years.	Round.	Slack.
1874	659,681	89,446
1873	810,353	70,753
1872	710,329	69,584

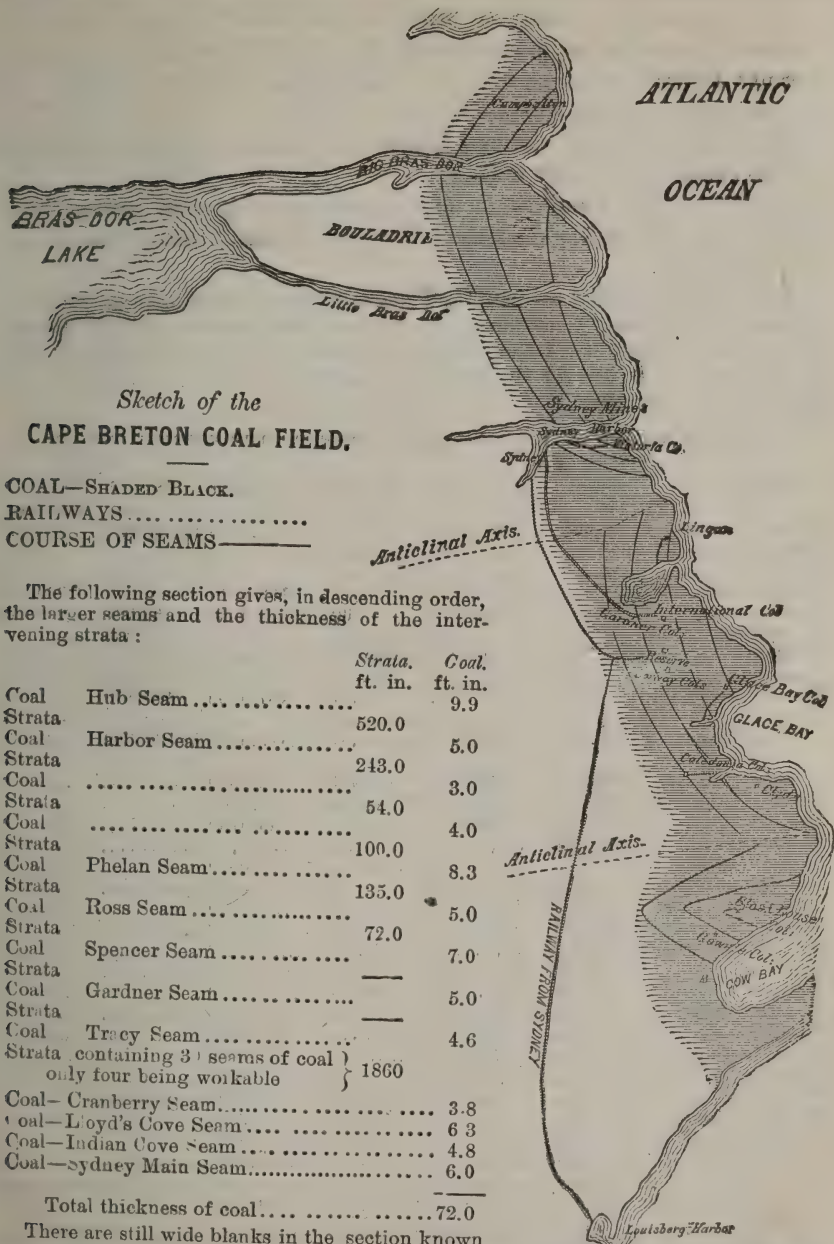
The following may be taken as a rude estimate of the items of expense in shipping a ton of coal, calculated on an annual output of 60,000 tons :

	Cents per ton.
Hewing	50
Pumping and underground work	13
Overmen and winding	10
Screening	5
Royalty	10
Railroad (five miles)	15
Shipping	5
Salaries, expenses, taxes, etc.	45
Total (Canadian currency)	\$1 58

The most serious drawback is the small coal, one seventh of all mined being what is known as slack, frequently not finding a market at any price. In 1874, the slack was 89,446 tons, and "round coal," 659,681 tons.

The ton weight designated is that of 2,240 pounds, in all cases.





## THE GERMAN EMPIRE.

The figures which we give herewith show the production of coal in the German Empire, which now includes old Prussia, Saxony, Bavaria, and the other States of the Zollverein.

The coal is known as coal and lignite or "Brown coal," one-third of the output being of the latter variety.

The following full and official statistics of the production having been procured by Mr. James Macfarlane from Berlin, have been by him kindly furnished.

For 1873 the official returns for Prussia proper, alone have as yet been collected. The other portions of the Empire only produce about 5,000,000 tons. For the year 1871 the political divisions were different from those of 1872 and 1873, but for the sake of comparison the returns are all arranged in one table.

## OFFICIAL REPORT OF THE COAL PRODUCTION OF THE GERMAN EMPIRE.

Provinces.	1871.		1872.		1873.	
	Tons of Coal.	Tons of Br'n Coal.	Tons of Coal.	Tons of Br'n Coal.	Tons of Coal.	Tons of Br'n Coal.
Silicia .....	8,27,239	397,304	9,371,428	407,955	10,063,829	423,528
Posen .....				10,683		12,711
Pomerania.....				123		689
Brandenburg .....				1,139,014		1,279,502
Saxony .....	88,976	6,122,697	71,790	5,538,403	52,257	5,924,427
Westphalia.....	12,715,249	41	9,034,216	127	10,224,313	
Rhenish Prov's..	4,259,254	171,131	10,543,786	143,255	11,475,837	130,771
Hanover.....			395,785	2,611	419,323	4,696
Hesse Nassau..}	376,325	185,072	106,770	207,515	112,350	211,508
<b>Total Prussia..</b>	<b>25,967,043</b>	<b>6,876,245</b>	<b>29,523,775</b>	<b>7,419,636</b>	<b>32,347,909</b>	<b>7,987,832</b>
Bavaria .....	390,754	23,098	412,413	12,063		
Saxony .....	2,888,414	572,340	2,945,261	601,448		
Hessen .....		41,857		46,576		
Baden .....	11,399		11,715			
Mech. Schwerin..				4,064		
Saxe Weimer....	933	1,337	460	635		
Oldenburg.....	2		2			
Brunswick.....	1,045	216,475	498	185,295		
Saxe Meiningen..	14,302		13,571			
S. Co. Gotha.....	459		748			
Schaum Lippe....	98,921		106,770			
S. Altenburg.....		230,170		223,709		
Anhalt.....		486,231		467,454		
S. Rudolstadt....		20,139		15,835		
S. Sondersh .....		4,500		5,500		
Reuss J. L.....		6,800		3,600		
Alsace.....			290,205	2,233		
	29,373,272	8,479,192	33,306,418	9,018,048		
Total 1871..		37,852,464	Total 1872..		42,324,466	
						Total of Prussia, only
						1873.. 44,335,741

For convenience it is usual to count twenty German centners as one ton, and as they are 113.38 pounds English, the tons in this table are 2,267 pounds, or 27 pounds more than our gross tons.

The production of coal and Brown coal in Prussia for a series of years previous to the year 1871, has been as follows :

1837.....	1,950,915	1864.....	19,408,982
1857.....	9,841,220	1865.....	21,791,705
1858.....	10,721,323	1866.....	21,629,746
1860.....	12,347,828	1867.....	23,738,327
1861.....	14,133,048	1868.....	25,704,758
1862.....	15,576,278	1869.....	26,774,368
1863.....	16,906,707	1870.....	23,316,238

As now consolidated, Germany ranks as the largest producer of coal in Europe, and the third in the world.

The coal measures are said to be twenty thousand feet in thickness and contain 117 seams, giving in all 294 feet of coal; of workable seams there are 77 seams, with 260 feet of coal. The seams are often found to be ten, twelve, and fourteen feet in thickness. The lowest seams are Bituminous or coking coals, and the higher they range in the series, the more dry or Anthracitic do they become. Almost the whole of the coal raised is consumed in the country itself, the quantities imported and exported balancing themselves.

### BRITISH COAL STATISTICS.

The following will show the amount of coal mined in the United Kingdom of Great Britain, as also the exports to foreign ports:

YEAR.	TONS MINED.	TONS EXPORTED.	YEAR.	TONS MINED.	TONS EXPORTED.
1854.....	64,600,000	4,300,000	1864.....	92,787,873	8,809,908
1855.....	61,400,000	4,900,000	1865.....	98,150,587	9,170,477
1856.....	66,600,000	5,800,000	1866.....	101,630,344	9,053,721
1857.....	65,300,000	6,600,000	1867.....	104,500,480	10,415,787
1858.....	65,000,000	6,500,000	1868.....	103,141,157	10,837,804
1859.....	71,900,000	7,000,000	1869.....	107,427,557	10,588,423
1860.....	83,200,000	7,400,000	1870.....	112,875,725	11,495,002
1861.....	85,600,000	7,200,000	1871.....	117,352,028	12,851,957
1862.....	86,600,000	7,600,000	1872.....	123,386,750	13,211,961
1863.....	88,200,000	7,500,000	1873.....	127,012,767	12,712,222

The following is the disposition and uses made of the coal raised during the year 1873:

Coal exported to foreign countries.....	12,712,222	tons.
Coal used on railways.....	3,790,000	"
Coal used in iron manufacture.....	35,119,709	"
Coal used in smelting other metals.....	763,607	"
Coal used in mines and collieries.....	9,590,000	"
Coal used in steam navigation.....	3,630,000	"
Coal used for steam power in manufactories.....	27,550,000	"
Coal used in gas manufacture.....	6,560,000	"
Coal used in water works.....	650,000	"
Coal used in potteries, glass-works, brick, lime, cement kilns.....	3,450,000	"
Coal used in chemical works and all other sundry manufactures.....	3,217,229	"
Coal for domestic consumption.....	21,051,000	"
Making the total of.....	127,012,767	"



Statistics showing number of collieries, persons employed, lives lost, etc., in the coal mines of the United Kingdom in the year 1873.

Number of collieries .....	8,527
Male persons employed .....	514, 40
Separate fatal accidents .....	973
Lives lost .....	1,069
Average number of persons employed per accident .....	5.6
Average number of persons employed per life lost .....	479
Average number of tons of coal raised per accident .....	146,367
Average number of tons of coal raised per life lost .....	133,677

The following details of the mineral resources of the United Kingdom are interesting :

MINERALS.	Tons raised in 1872.	Tons raised in 1873.
Coal .....	123,497,316	127,016,747
Iron ore .....	16,584,857	15,577,499
Copper ore .....	91,983	89,188
Tin ore .....	14,266	14,883
Lead ore .....	83,968	73,590
Zinc ore .....	18,543	15,969
Iron pyrites .....	65,916	58,924
Arsenic .....	5,172	5,448
Bismuth .....	2	1
Cobalt .....	1	6 cwt
Manganese .....	7,773	8,671
Ochre, umber, etc. ....	3,327	6,363
Wolfram .....	88	50
Fluor spar .....	81	.....
Chloride of barium .....	65	.....
Barytes .....	9,93	10,269
Clays—fine and fire, and shale (estimated) .....	1,200,000	1,785,000
Coprolites .....	35.00	.....
Salt .....	1,39,498	1,785,000

METALS OBTAINED FROM THE ORES ENUMERATED.

	1872—tons.	1873—tons.
Iron, pig .....	6,741,929	6,666,450
Tin .....	9,560	9,972
Copper .....	5,733	5,240
Lead .....	60,455	54,235
Zinc .....	5,191	4,471
Silver .....	628,920 (cwt.)	537,707

Absolute total value of the metals and coal, with other minerals which are not smelted (except building stone, lime, slate, and common clay), produced in the United Kingdom :

	1872.	1873.
Value of the metals produced .....	£22,70,447	£21,409,878
Value of the coal .....	46,311,143	47,629,787
Value of other minerals .....	1,811,826	1,631,834
Total .....	£70,193,416	£70,721,499

The ton weight, in all cases, is 2240 pounds.

The following shows the destination of the exports from Great Britain for the years 1871, 1872 and 1873. The statement for 1873, includes 361,649 tons cinders, and 278,410 tons of patent fuel. British North America received 141,338 tons. The United States is charged with 58,762 tons for the Atlantic seaboard, and 28,879 tons for the Pacific. The British West Indies received 155,307 tons; and the foreign West Indies 261,843 tons.

	1871.	1872.	1873.
Russia.....	914,432	796,055	612,269
Sweden.....	397,950	507,662	532,442
Denmark.....	658,707	643,881	593,199
Germany.....	2,396,812	2,115,128	1,668,680
Holland.....	506,470	472,002	465,316
France.....	2,006,152	2,191,340	2,479,421
Spain.....	596,952	635,695	619,248
Italy.....	826,059	926,453	802,992
Brazil.....	329,307	312,864	395,081
British India.....	594,226	553,748	625,437
Other places.....	3,526,320	4,060,133	3,908,212

The city of London is set down for 7,824,288 tons for the year 1873, of which 1,681,913 were sent beyond the limits.

The railway consumption of coal was :

	Miles.	Tons.
1872.—Miles traveled by trains and coal consumed.....	190,720,719	3,661,150
1873.—Miles traveled by trains and coal consumed.....	197,451,216	3,790,000

The shipments to foreign ports were derived from the following districts:

	Tons.		Tons.
Northumberland and Durham.....	5,862,179	South Wales.....	3,648,140
Cumberland.....	290	Scotland.....	1,523,950
Yorkshire and Derbyshire.....	721,782	Ireland.....	1,287
Lancashire and Cheshire.....	675,926	Ports distant from coal fields....	86,060
Gloucester.....	11,609		

The percentage of the output of each district was as below :

	Per cent.
Northumberland, Durham and Cumberland.....	26
Gloucester, Shropshire, Stafford, Worcester, Warwick.....	15
Welsh Counties.....	14
Scotland.....	13
Lancashire and Cheshire.....	12
Yorkshire.....	12
North Midland.....	8

Mr. Robert Hunt, the keeper of mining records, makes the output for 1873, 127,016,747 tons, and the reports of the mine inspectors give 128,544,400 tons.

## COAL IN BELGIUM.

The little kingdom of Belgium, which, until a little more than forty years ago, had no place upon the map of Europe, owes all its prosperity and importance to coal and iron. The coal basin lying between Liege and Mons, and including Namur and Charleroi, comprises an area in course of development of 300,000 acres. The feature of the Belgian coal field is the large comparative extent of the workable surface, owing to the singular contortions of the seams, which are remarkable for their number. The qualities of Belgian coal are very varied, the most noticeable being the *Fleury* seam, which is similar to the Swansea coal, of South Wales, and is peculiarly adapted for gas-making and furnace purposes; but the disagreeable odor it emits during combustion precludes its general use for household purposes. The other leading classes of coal mined in Belgium are distinguished as *dures* (hard), *grasses* (fat or coking), and *maigres* (dry, and burning with a small flame).

The production and exportation of coal since 1836 may be observed from the following table :

Years.	Production. Tons.	Exportation. Tons.
1836 .....	3,056,464	773,612
1846 .....	5,037,403	1,355,833
1856 .....	8,212,419	2,866,137
1866 .....	12,774,662	3,977,702
1868 .....	12,298,789	3,764,502
1869 .....	12,926,894	3,592,790
1867 .....	12,755,822	4,400,364
1870 .....	13,697,118	3,182,150
1871 .....	13,733,175	3,186,204
1872 .....	15,658,948	4,608,100
1873 .....	16,000,000	4,171,000

The Belgian ton is 1000 kilogrammes=2,200 pounds English.

The output is furnished by the different basins in the following proportions :

Basins.	Per cent.	Basins.	Percent.
Mons.....	27.2	Liege.....	23.3
Charleroi.....	27.1	Namur.....	2.5
Centre.....	19.9		

The exports from Belgium during the years 1872 and 1873 were destined as below :

Countries.	1872.	1873.
France.....	4,100,000	3,900,000
Holland.....	309,000	124,000
Germany.....	63,000	31,000
Other countries.....	136,000	116,000

The imports into Belgium amounted to 221,890 tons in 1872; the net home consumption for the same year is stated to have been 10,672,024 tons.



## COAL IN FRANCE.

There are fifty-nine small coal basins in France, but the most important are those of the Loire and St. Etienne, which are the best known, and comprise about 50,000 acres.

Probably one million tons of what is known as Anthracite, and the same quantity of soft Anthracite, are annually produced in France, the balance being Bituminous coal.

The development of the coal fields surrounding Saint Etienne, Rivede-Gier, and Givors, is of comparatively recent date. Two centuries ago, Saint Etienne was a small hamlet, inhabited by a small community of craftsmen skilled in the arts of cutting tools, forging arms and weaving ribbons. As for the other two places, they neither had a local habitation nor a name. The northern basin of the French coal field, which is really a continuation of that of Belgium, has its chief and busiest centres about Dinain, Anzin, Valenciennes, and the Pas-de-Calais. The more important of the French collieries in the department of the Saone-et-Loire are those of Epinac and Blanzay; but we must not omit to mention Creuzot, which, although a desolate valley a century ago, is now, by its collieries and iron works, giving active employment to an industrial army ten thousand strong. Among the more recent developments of the coal fields of France may be mentioned those of Alais Grand Combe; Besseges and Portes, in the Gard, which, although unrecognized twenty-five years ago, now give a combined annual yield of nearly 2,000,000 tons; the department of the Gard being, in fact, the third in importance of the French coal fields. The basin of Aubin, in Aveyron, and the mining district of Le Maine, have, in the course of a few years, sprung into renown.

The production of coal in France, since 1787, as been as follows (tons of 2200 pounds, or ten metric quintals):

1787.....	211,160	1836.....	2,789,858	1868.....	13,253,876
1802.....	829,105	1841.....	3,342,303	1869.....	13,138,662
1811.....	759,878	1846.....	4,382,532	1870.....	6,550,000
1816.....	921,823	1852.....	4,816,306	1871.....	13,407,000
1821.....	1,114,418	1857.....	7,455,987	1872.....	15,899,005
1826.....	1,513,482	1862.....	10,102,116	1873.....	17,500,000
1831.....	1,728,950	1867.....	12,148,223		

The figures for 1870 and 1871 are from official sources, received at Paris; for 1872 and 1873, from the late report of the French Parliamentary Commission, giving details of each department; this is the most complete report on the coal resources of France yet published.

During the first six months of 1874 there were 8,159,582 tons produced.

Below will be found the production and consumption of coal in France during the past five years :

Years.	Production.	Consumption.
1869.....	13,100,000	1,421,723
1870.....	13,300,000	16,859,034
1871.....	13,600,000	18,512,246
1872.....	15,900,000	21,993,362
1873.....	17,500,000	22,700,000

### COAL IN RUSSIA.

The chief centres of the Russian coal supply are as follows : In the south, the basin of the Lower Don, which contains 15,000 square miles of the finest Anthracite ; in the west, the governments of Kiev and Kharkoff ; and further to the north, the great central or Moscow basins, comprising the governments of Tver, Kalouga, Moscow, Riazan, Tula and Novgorod, extending northward as far as the Dwina. The official estimates made in December, 1871, rate the supply as follows : Basin of the Lower Don, 15,000,000,000 poods (the pood being 36 pounds), government coal fields of Poland, 516,000,000 poods ; Moscow basin, 15,000,000,000 poods ; Kiev Government, 80 miles of superficies by 21 feet of thickness (actual contents not specified). To these items may be added those of the Kharkoff and Ekaterinoslay beds of Anthracite and private coal fields of the "Privislinski Krai," the districts lying to the east of the Vistula.

The amount of coal of the various qualities that have been produced during the years given is stated below :

	1870.	1871.	1872.
Coal.....	470,671	573,450	378,350
Lignite.....	9,037	23,832	27,586
Anthracite.....	216,501	232,440	331,896
Total (tons of 2,240 pounds) ..	696,209	829,722	1,097,832

The estimated product of all kinds for 1873 is 1,200,000 tons.

The total area of the coal fields of the Empire of Russia is put at 30,000 square miles.

## COAL IN AUSTRIA.

Austria contains such large deposits of coal wealth, that naturally she may be regarded as one of the richest coal-producing nations of Europe. Silesia, Galicia and Bohemia are said to contain deposits of coal sufficient to supply the whole consumption of Europe for several centuries; but this, we fear, is rather tall talk, although the coal wealth of the districts named is doubtless very considerable. It is only recently that this has been turned to profitable account. Industry is not in a very advanced state in Eastern Europe, and the scattered population of the districts in question have only been recently united with each other and with the great and ever-extending railway network of the present epoch. During the last twenty years a not unimportant material progress has been achieved, however, especially in Moravia, Silesia and Bohemia, where a dense and laborious population has resolutely embarked in the great industrial movement of modern times.

In 1818 the production of coal in Austria and Hungary was 84,450 tons; in 1828 it was 153,950 tons; and in 1838, 299,100 tons. The progress made in the twenty years was not very marked, but it has since been greatly accelerated, the production having risen in 1848 to 838,000 tons; in 1858 to 2,598,800 tons. Below will be found the details from the year 1860 up to the present time.

Years.....	Pit Coal.	Lignite, etc.
1860.....	1,739,455	1,389,023
1861.....	2,025,323	1,604,339
1862.....	2,252,951	1,811,767
1863.....	2,278,342	1,805,477
1864.....	2,265,510	1,896,158
1865.....	2,532,933	1,199,483
1866.....	2,416,783	1,952,799
1867.....	2,967,963	2,477,428
1868.....	3,334,065	2,864,962
1869.....	3,493,209	3,191,952
1870.....	3,483,250	2,960,325
1871.....	4,892,481	4,998,869
1872.....	4,713,280	5,676,672
1873.....	5,000,000	6,000,000

The consumption of coal during the years named has been as follows:

Years.....	Tons...	Years.....	Tons...
1866.....	4,699,737	1870.....	8,357,837
1867.....	4,707,804	1871.....	10,365,509
1868.....	6,799,899	1872.....	10,861,575
1869.....	7,529,163		

## COAL IN SPAIN.

The area of the coal fields in Spain is set down as 2,240,595 acres; the product is about 525,000 tons of coal, and 45,000 tons lignite or brown coal, annually.



## COAL IN NEW SOUTH WALES.

The most extensively worked of the coal measures are those of Hunter River (or Newcastle), located on the southern and western sides of the river, and include Cannel and Splint coal, and kerosene shale.

About forty miles south of Sydney commences what is known as the "Wollongong" coal measure. Outcrops have been traced for thirty miles to the southward, while inland its extent is undetermined. The seam runs from six to eight, and in one part fourteen, feet in thickness.

To the west of Sydney, there is what are known as the Hartley coal measures, producing a non-caking coal, approaching a Splint, and from nine to eleven feet in thickness. Communication with these mines is had by railway to Sydney. In connection with this district we may mention the Cannel coal of Petrolea Vale, a long valley running down on the northern side of Mount York. The seam is six feet in thickness, eight inches on the top and four inches at the bottom being common kerosene shale, while the remaining five feet consist of fine Cannel coal, giving an average of 150 gallons of crude oil to the ton. The seam is worked by an adit on the outcrop.

The specific gravity of the oil made from this shale is 804 at 60 degrees Fahrenheit. The "flashing point" ranges from 118 degrees to 126 degrees Fahrenheit.

W. B. Clarke, M. A., in his report on the sedimentary deposits of New South Wales, embodied in the government reports, speaks of the geological position of the shales thus :

"Recent researches have satisfied me that these only belong to the upper coal measures.

"It has unquestionably resulted from the local deposition of some resinous wood, and passes generally into ordinary coal.

"There is no anomaly in finding in one spot a mere patch in a coal seam, as at Anvil Creek, on the Hunter River, or thick bedded masses, as in the coal seams of Mount York, the thickness depending on the original amount of drift timber."

W. Keene, F. G. S., government examiner of coal fields, says :

"The lower beds of the coal series of New South Wales are geologically older than any worked in Europe, while the upper beds represent the most recent of the European true carboniferous formation.

"I have examined seams more than seven hundred miles to the north of Newcastle, belonging to the same deposits we are working here (Newcastle); and we may, without boasting, claim to rank with the most extensive coal fields in the world."

It is stated, that although the kerosene shale has only been worked at Hartley and Wollongong, it may possibly be found in connection with

any of the different coal seams, and as these spread over an enormous area of country, it is impossible to place any limits on the quantity of this peculiar mineral that the colony may possess.

The following return of the product is of interest :

Years.	Tons.	Years.	Tons.
1860.....	368,862	1867.....	770,012
1861.....	342,067	1868.....	954,230
1862.....	476,522	1869.....	919,773
1863.....	433,889	1870.....	800 000
1864.....	549,012	1871.....	790,143
1865.....	585,525	1872.....	942,510
1866.....	774,248	1873.....	1,000,000

There were also 7,500 tons of kerosene shale mined in 1869, valued at an average of £3 per ton.

In 1860, when the product was only 368,862 tons, the value is put at £229,493; while in 1869 it is but £346,145 for the 949,773 tons produced. The number of persons employed in 1869 was 2,012.

The shipments from New South Wales to San Francisco, California, have increased from 7,850 tons, in 1860, to 139,106 tons, in 1874. The receipts on the Atlantic seaboard have been small.

The kerosene shale was stated to produce a gas of ninety-seven candle illuminating power, by tests made in New York, during 1874.

Shale has been discovered in large quantities at Berrined.

The demand for coal for manufacturing, steamships, and for exports is rapidly increasing.

In this country is found what is called "white coal." It is a species of lignite, and the color is most likely due to the absence of bitumen. It is fibrous, easily combustible, and burns with a light flame and no smoke. Large deposits are said to exist, at or near the surface.

## INTERESTING FACTS AND FIGURES.

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### WEIGHT OR MEASURE.

The Constitution of the United States provides for "a standard of weights and measures," but at present there is not a national observance of this enactment. We have bushels, boxes, barrels, hhds., tons 2000 lbs., and 2240 lbs., oftentimes two or more systems in one State, and occasionally in the same region. We propose that all coal be mined, carried and sold at 2000 lbs. to the ton, wholesale and retail. It will then be possible to calculate production, compare prices and in fact, set the whole trade on a substantial foundation, which is impossible under the present disorganized and sectional systems of measurement. Reader, will you please give this matter your earnest attention?

### LARGE MINE VENTILATOR.

The largest mine ventilator in the world is a Guibal fan, 45 feet in diameter, and 12 feet face, at the Usworth Colliery, near Newcastle-on-Tyne, England. This fan runs about forty-five revolutions per minute, and is said to circulate 200,000 to 250,000 cubic feet of air per minute. It is driven by two first motion engines, 36 inch diameter cylinders, 3 feet stroke. The upcast shaft is 10 feet diameter, and 600 feet deep. The workings in three seams are ventilated through it. The output of the Usworth Colliery is about 1500 tons per day. The mines are very extensive. All the underground haulage is performed by machinery; two of the three seams are worked on the bord and pillar system; the other is worked on the longwall plan.

### COAL TRADE ON LAKE ERIE.

The first time that Bituminous coal appears as an article of commerce on the Lake was in the year 1829, when the northern division of the Ohio canal was opened from Akron, O., on the edge of the Ohio coal field. Up to 1854 it was brought by this means to Cleveland. In that year the Cleveland and Pittsburgh and the Cleveland and Mahoning roads penetrated the coal fields, and gave another outlet. The Bituminous coal from Mercer County, Pa., is received and shipped at Erie, Pa. These two ports transact about all the Bituminous coal business of Pennsylvania and Ohio on the lakes.

### CHARLEROI, BELGIUM.

The number of collieries in operation in the district of Charleroi, Belgium, is 56, having 112 pits. The number of extracting machines is 117, of 17,000 horse-power; 67 pumping engines, of 10,226 horse-power; 146 ventilating machines, of 4,507 horse-power. There are, moreover, 222 other engines, of 2,063 horse-power. The number of underground workmen is 31,896, while above ground 11,513 are employed.



## VOLUME OF GAS OBTAINED FROM A TON OF COAL.

	CUBIC FEET.	SPECIFIC GRAVITY.
Boghead Cannel.....	13,334	.42
Wigan Cannel.....	15,426	.73
Cannel.....	15,000	.58
Cape Breton.....	9,500	—
Cumberland.....	10,000	—
English, <i>nom.</i> .....	11,000	.24
Newcastle.....	10,000	.05
Kilkenny.....	12,500	.04
Oil and Grease.....	23,000	.67
Pictou and Sydney.....	8,000	—
Pine Wood.....	11,800	.66
Pittsburgh Coal.....	9,520	—
Resin.....	15,600	.66
Scotch Coal.....	15,000	.56
Virginia Coal.....	8,963	—
Wallsend.....	12,000	.42

## CUBIC CONTENTS OF A TON.

Few persons have any idea as to the amount of coal that can be stowed in a given space; we therefore give an example of the manner in which it may be figured up. A shed or room, 15 feet high, 18 feet wide, and 30 feet long, will hold 200 tons of Anthracite coal, and perhaps ten tons less of Cumberland. Thus  $15 \times 18 \times 30 = 8100$ , divided by 40, average cubic contents of a ton of Anthracite =  $202\frac{1}{2}$ .

The average number of cubic feet required to stow a ton of coal is as follows:

## BITUMINOUS.

Cumberland, maximum.....	42.3
do. minimum.....	41.2
Duffryn, (Welsb).....	42.99
Cannel, (Lancashire).....	46.37
Blossburg, Pa.....	42.2
Hartley, Newcastle.....	41.
Pictou, Nova Scotia.....	45.
Pittsburgh, Pa.....	47.08
Sydney, Cape Breton.....	47.02
Clover Hill, Va.....	49.02
Cannelton, Indiana.....	47.
Scotch.....	43.08
Richmond, Va., (Midlothian).....	41.04

## ANTHRACITE.

Peach Mountain.....	41.06
Forest Improvement.....	41.07
Beaver Meadow, No. 5.....	39.08
Lackawanna.....	45.08
Lehigh Co's.....	40.05
Beaver Meadow, No. 3.....	40.07

## COKE.

Natural of Virginia.....	48.03
Pittsburgh.....	70.09
Charcoal.....	104.

—FROM JOHNSON'S REPORT TO THE NAVY DEPARTMENT.

## COMPARATIVE YIELD OF COAL BEDS.

Comparison of yield of north and south dipping coal beds, in 1856, in Schuylkill County, Penna.

North Dip, 10 collieries, Red Ash.....	84,732 tons.
North Dip, 5 collieries, White Ash.....	91,222 tons.
South Dip, 48 collieries, Red Ash.....	57,561 tons.
South Dip, 26 collieries, White Ash.....	745,231 tons.
North and South Dip, 11 collieries, Red Ash.....	35,222 tons.
North and South Dip, 5 collieries, White Ash.....	120,101 tons.

The north dips are steeper in the Schuylkill basin than the south, and therefore more slipped and crushed, thinner and more broken. This is one of the principal arguments for the "Wave Theory of Rogers."

## BREAKING STRAIN OF WIRE ROPE.

## ROPES OF 133 WIRES.

	Circumference	Diameter.	Strength.
	Inches.	Inches.	Tons.
No. 1.....	6 $\frac{3}{4}$	2 $\frac{1}{4}$	71.00
No. 2.....	6	2	65.00
No. 3.....	5 $\frac{1}{2}$	1 $\frac{3}{4}$	51.00
No. 4.....	5	1 $\frac{5}{8}$	43.60
No. 5.....	4 $\frac{3}{8}$	1 $\frac{1}{2}$	35.00
No. 6.....	4	1 $\frac{1}{4}$	27.20
No. 7.....	3 $\frac{1}{2}$	1 $\frac{1}{8}$	20.20
No. 8.....	3 $\frac{1}{8}$	1	16.00
No. 9.....	3	$\frac{7}{8}$	11.40
No. 10.....	2 $\frac{1}{2}$	$\frac{3}{4}$	8.64
No. 10 $\frac{1}{4}$ .....	2	$\frac{5}{8}$	5.13
No. 10 $\frac{1}{2}$ .....	1 $\frac{5}{8}$	$\frac{9}{16}$	4.27
No. 10 $\frac{3}{4}$ .....	1 $\frac{1}{2}$	$\frac{1}{2}$	3.48

—JOHN A. ROEBLING'S SONS.

## WEIGHT OF T RAIL

Weight of T rails in pounds per yard, and in tons of 2,240 pounds per mile.

At 16 pounds per yard it requires	25 tons and 325 pounds per mile.
At 18 pounds per yard it requires	23 tons and 610 pounds per mile.
At 20 pounds per yard it requires	31 tons and 660 pounds per mile.
At 22 pounds per yard it requires	34 tons and 1280 pounds per mile.
At 25 pounds per yard it requires	39 tons and 640 pounds per mile.
At 28 pounds per yard it requires	44 tons per mile.
At 30 pounds per yard it requires	47 tons and 320 pounds per mile.
At 33 pounds per yard it requires	51 tons and 1920 pounds per mile.
At 45 pounds per yard it requires	65 tons and 960 pounds per mile.
At 48 pounds per yard it requires	75 tons and 960 pounds per mile.
At 68 pounds per yard it requires	106 tons and 1920 pounds per mile.

## THE DUTY ON COAL.

There is no Anthracite imported. On Bituminous coal the duty is 75 cents per ton, gold, on the coarse coal; and on the culm of coal 40 cents per ton gold; since August 1st, 1872. Previous to that date it was \$1.25 per ton, and 25 per cent. *ad valorem*, respectively.

## PRICES OF SCHUYLKILL COAL.

We give below the average prices for Schuylkill White Ash Coal, on board vessels at Philadelphia, from 1834 to 1873, inclusive; prepared by W. G. Neilson, and I. W. Morris, Jr.:

YEARS.	PRICES.	YEARS.	PRICES.
1834.....	\$4 50	1854.....	\$5 19
1835.....	4 84	1855.....	4 49
1836.....	6 64	1856.....	4 11
1837.....	6 72	1857.....	3 87
1838.....	5 27	1858.....	3 43
1839.....	5 00	1859.....	3 25
1840.....	4 91	1860.....	3 40
1841.....	5 79	1861.....	3 39
1842.....	4 18	1862.....	4 14
1843.....	3 27	1863.....	6 06
1844.....	*3 20	1864.....	†3 39
1845.....	3 46	1865.....	7 86
1846.....	3 90	1866.....	5 80
1847.....	3 80	1867.....	4 37
1848.....	3 50	1868.....	3 86
1849.....	3 62	1869.....	5 31
1850.....	3 64	1870.....	4 39
1851.....	3 34	1871.....	4 46
1852.....	3 46	1872.....	3 74
1853.....	3 70	1873.....	4 19

\* Lowest point. † Highest point.

## MODES OF WORKING ADOPTED IN THE COAL MINES OF GREAT BRITAIN.

BANKS AND STRAIT WORK, BORD AND PILLAR, WITH LONGWALL.—Yorkshire.

BORD AND PILLAR.—Northumberland, North Durham, Cumberland, South Durham, North Staffordshire, Cheshire and Shropshire.

BORD AND PILLAR AND LONGWALL.—East and West Scotland.

LONGWALL — Derbyshire, Nottinghamshire, Leicestershire, Warwickshire, South Staffordshire,\* Worcestershire.

SPECIES OF BORD AND PILLAR.—North, East and West Lancashire, South Wales

STRAIT AND STALLS.—Monmouthshire, Gloucestershire, Somersetshire, Devonshire, South Wales.

\*Special method of working ten yard seam.

## STATISTICS OF THE ANTHRACITE AND BITUMINOUS COAL TRADE ON THE NEW YORK CANALS.

Year.	Tons Arriving at Tide-Water.		Tons Shipped.		Total Tons Shipped.
	Anthr'e.	Bitum's.	Anthr'e.	Bitum's.	All Kinds.
1863.....	8,438	62,389	434,136	234,521	732,657
1864.....	11,806	73,530	485,582	369,481	855,063
1865.....	10,806	52,515	413,152	287,531	720,693
1866.....	14,214	110,746	690,612	446,001	1,126,613
1867.....	13,774	124,686	773,146	509,474	1,283,231
1868.....	17,774	108,261	1,057,388	554,301	1,324,384
1869.....	22,482	131,084	656,104	638,304	1,324,408
1870.....	19,798	143,445	896,260	661,925	1,558,185
1871.....	39,207	55,800	602,044	591,993	1,194,037
1872.....	34,075	81,475	736,973	555,797	1,292,770
1873.....	29,559	90,591	967,593	658,266	1,625,859



## COAL IN MICHIGAN.

The only coal that has been used at all successfully, that is mined in this State, is found in Jackson County. The business is very small, amounting to not over 30,000 tons annually. An analysis gives it:—Carbon, 45; Volatile Matter, 39; Ash, 2; Sulphur, 2; Water, 2. This great State is therefore supplied with fuel by our Pennsylvania and Ohio coal mines.

## THE MECHANICAL EQUIVALENT OF HEAT.

In an elaborate paper by Professor Joule, we have results thus stated:—1. The quantity of heat produced by the friction of bodies, whether solid or liquid, is always proportional to the quantity of force expended. 2. The quantity of heat capable of increasing the temperature of a pound of water by 1° Fahrenheit, requires for its evolution the expenditure of a mechanical force required by the fall of 772 pounds through the space of one foot.

Dr. Tyndall gives the following explanation of the term “foot-pounds,” used as a measure by Joule:—The quantity of heat which would raise one pound of water one degree in temperature is exactly equal to what would be generated if a pound-weight, after having fallen 772 feet, had its moving force destroyed by collision with the earth. Conversely, the amount of heat necessary to raise a pound of water one degree would, if applied mechanically, be competent to raise a pound-weight 772 feet high, or it would raise 772 pounds one foot high. The term “foot-pound” expresses the lifting of one pound to the height of a foot. Thus the heat required to raise the temperature of one pound of water one degree being taken as a standard, 772 foot pounds constitute what is called *the mechanical equivalent of heat*.

## ALBERT COAL —“ALBERTITE.”

Prof. Henry Wurtz, writes:—“This very remarkable material from New Brunswick is too well known to all gas engineers in the Eastern United States to require any description here. Its almost complete freedom from sulphur and from ash, and its very large yield of rich gas, makes it the most highly esteemed of all the enriching materials at present available for gas-making in the eastern portion of the United States. Unlike most cannels, its use does not sensibly impair the value of the coke produced; while it imparts, even in quantities as small as five per cent., a very satisfactory quality to the gas from common caking coals. It is not well suited to carbonization alone, owing to its highly inflammable nature, in which it resembles asphaltum. But we have obtained some results with it by the hydrocarbon process which are hereafter given.”

The following results on its gas-producing powers by the common process were obtained at their experimental works by the Manhattan Gas Light Co., in New York:

Weight of charge per retort, 224 lbs. Time of carbonizing, three hours and ten minutes.

Yield of gas per ton of 2,240 lbs., 14,784 feet, (equal to 6.6 feet per lb.) Illuminating power of three cubic feet burnt in a Scotch tip fish tail, 29.74 candles, equal per five cubic feet, to 49.55 candles.

Yield of coke, per ton, 16.8 bushels. Weight of coke, per ton, 806 pounds. Gas perfectly purified by lime. The coke burns well and rapidly, without clinker.

## ANALYSIS OF COAL.

Volatile matter.....	57.70
Fixed Carbon.....	41.90
Ash.....	0.40

We deduce from this the value of one ton in lbs. of sperm equal 2511.57 lbs.

## COAL IN TEXAS.

The coal-bearing rocks of Texas occupy an area of not less than six thousand miles, embracing the counties of Jack, Young, Palo, Pinto, Eastland, Brown, Comanche, Callahan, Coleman, and extending to the territory of Bexar. The rocks contain the characteristics belonging to the coal measures of Missouri and other Western States. In general appearance this coal resembles that of Belleville, Illinois. The analysis gives:—Fixed Carbon, 52 per cent.; Volatile Matter, 36 per cent.; Ashes, 3 per cent.; It cokes with a great flame, without changing its form. Anthracites, lighter and more brittle than those of Pennsylvania, have been found in various parts of the State. Lignites and other coals of more recent origin, occupy an area of ten thousand square miles.

## UNDERGROUND TEMPERATURE.

Regarding underground temperatures, a very valuable set of observations has been received from a mine, 1,900 feet deep, in Prague, Bohemia. The depths and corresponding temperatures are as follows :

Depth in feet.	Degrees Fahrenheit.	Depth in feet.	Degrees Fahrenheit.
68	47.9	1290	58.3
299	48.8	1414	59.4
621	50.7	1652	61.4
939	57.8	1900	64.1

## DEEPEST COAL PIT.

The deepest pit in the world is said to be at Chatelineau, three miles from Charleroi, Belgium. It is 2822 feet deep from the surface, and it was intended to sink another shaft in a tunnel from the bottom of the first shaft, a further depth of 492 feet, making a total depth of 3314 feet. The deepest coal shaft in England is the Dunkenfield, 2,060 feet, took ten years time to sink, cost \$500,000, and this to reach a bed of coal only 4 ft. 8½ inches thick.

## COAL IN VANCOUVER'S ISLAND.

The Vancouver Coal Company shipped 45,728 tons of coal in the year 1873, presenting a decrease of 420 tons, as compared with the corresponding figures for 1872.

## COST OF MAKING IRON IN THE LEHIGH VALLEY.

The following table shows the several items entering into the cost of making iron in the Lehigh Valley, Pennsylvania, and the progressive increase of each, per ton of 2000 lbs.

COST OF	1850.	1855.	1860.	1864.
Ore.....	\$5 75	\$7 51	\$7 45	\$9 12
Coal.....	3 70	4 63	3 49	5 41
Limestone.....	0 93	1 26	1 24	1 93
Labor.....	2 22	2 85	1 87	2 85
Interest, etc.....	1 65	2 62	2 83	1 66
	1866.	1869.	1871.	1873.
Ore.....	\$12 19	\$11 86	\$12 67	\$13 00
Coal.....	7 55	7 41	8 59	7 15
Limestone.....	2 65	2 14	2 08	1 97
Labor.....	3 46	3 46	3 54	3 79
Interest, etc.....	2 03	1 96	2 77	2 76

## DISTANCES TO MARKET.

The following are the distances from a portion of the American coal fields, to the different tide-water markets :

FROM	BY	MILES.
Pottsville to New York .....	Canal	226
Pottsville to New York .....	Rail and Water	196
Pottsville to Philadelphia.....	Canal	106
Pottsville to Philadelphia.....	Rail	93
Mauch Chunk to New York.....	Lehigh Canal	172
Mauch Chunk to New York.....	Morris Canal	147
Mauch Chunk to New York.....	Rail	126
Mauch Chunk to Philadelphia.....	Canal	124
Mauch Chunk to Philadelphia.....	Rail	89
Carbondale to New York.....	Rail and Canal	208
Scranton to New York.....	Rail	143
Wilkesbarre to New York.....	Rail	192
Wilkesbarre to Philadelphia.....	Rail and Canal	168
Wilkesbarre to Mauch Chunk.....	Rail	55
Wilkesbarre to Baltimore.....	Rail and Canal	260
Wilkesbarre to Baltimore.....	Canal	246
Shamokin to Baltimore.....	Rail and Canal	200
Shamokin to Baltimore.....	N. Cent. R. R.	158
Cumberland to Baltimore.....	Rail	178
Cumberland to Georgetown.....	Canal	184
Cumberland to Alexandria..	Canal	191
Broad Top to Philadelphia.....	Rail	242
Clearfield to Philadelphia.....	Rail	240
Westmoreland to Philadelphia.....	Rail	332
Blossburg to New York.....	Rail	300
Kanawha to Richmond.....	Rail	325

## TABLE SHOWING THE TOLLS ON ONE TON OF COAL OF 2,240 LBS.

TO PLACES ON THE ERIE CANAL FROM ALBANY AND TROY.

	ALBANY.		TROY.	
	Miles.	Tolls.	Miles.	Tolls.
Schenectady.....	30	03.36	23	02.58
Utica.....	110	12.32	103	11.54
Syracuse.....	166	18.59	169	17.81
Rochester.....	259	29.01	252	28.22
Oswego.....	204	22.85	197	22.06
Brockport.....	279	31.25	272	30.46
Lockport.....	321	35.95	314	35.17
Tonawanda.....	340	38.08	333	37.30
Buffalo.....	352	39.42	345	38.64

The rate per mile on one gross ton is 1.<sup>12-100</sup> mills. To Buffalo from Troy the tolls are, as per above table, 38.<sup>64-100</sup> cents per gross ton.



## RECEIPTS AND SHIPMENTS AT CLEVELAND, OHIO.

The Bituminous coals received at Cleveland may be classed as follows :

Brar Hill or Block coal from the Mahoning region—reach Cleveland via A. & G. W. Railroad.

Massillon coal region—via C. & P. Railway and Canal.

Tuscarawus coal region—via L. S. & T. V. Railway and C. & P. Railway.

Salineville and Hammondsville region—via C. & P. Railway.

Sterling—via C. & P. Railway.

Pittsburgh coal region—via C. & P. Railway.

Straitsville—via C. C. & I. Railway.

Hocking—via C. C. & I. Railway.

Statistics in regard to the tonnage have not been very carefully preserved, but the following table may be relied upon as not being over-estimated, as it is compiled from the returns of the different transportation companies :

	RECEIPTS.	SHIPMENTS.	USED IN CLEVELAND.
1865.....	465,555	236,000	229,550
1866.....	583,407	295,280	288,127
1867.....	669,026	334,027	331,999
1868.....	759,104	392,928	366,176
1869.....	922,757	495,800	426,957
1870.....	904,600	482,396	422,210
1871.....	1,165,940	633,765	532,115
1872.....	1,348,160	745,595	602,565
1873.....	1,599,212	854,862	744,350

BUSINESS FOR 1874.—The receipts during 1874 amounted to 1,062,612 tons Bituminous, and 36,358 tons Anthracite; this is a great falling off from previous years. It is estimated that fully one half of this was re-shipped to Western ports, by lake.

The ton designated is that of 2000 lbs.

## TABLE FOR COMPUTING THE PRICE OF COAL.

PREPARED BY E. S. DRAKE.

LBS.	5.50	5.75	6.00	6.25	6.50	6.75	7.00	7.25	7.50	7.75	8.00
10.....	3	3	3	3	3	3	4	4	4	4	4
20.....	6	6	6	6	7	7	7	7	8	8	8
30.....	8	9	9	9	10	10	11	11	11	12	12
40.....	11	12	12	12	13	14	14	15	15	16	16
50.....	14	15	15	16	16	17	18	18	19	19	20
60.....	17	18	18	19	20	20	21	22	23	23	24
70.....	19	20	21	22	23	24	25	25	26	27	28
80.....	22	23	24	25	26	27	28	29	30	31	32
90.....	25	26	27	28	29	31	32	33	34	35	36
100.....	28	29	30	31	33	34	35	36	38	39	40
500.....	1.38	1.44	1.50	1.56	1.63	1.69	1.75	1.81	1.88	1.94	2.00
1000.....	2.75	2.88	3.00	3.13	3.25	3.38	3.50	3.63	3.75	3.88	4.00
1500.....	4.13	4.32	4.50	4.69	4.88	5.07	5.25	5.44	5.63	5.82	6.00
2000.....	5.50	5.75	6.00	6.25	6.50	6.75	7.00	7.25	7.50	7.75	8.00

## RULES FOR USING WIRE ROPES IN DEEP SHAFTS.

The following rules will be of interest to those having occasion to use wire ropes in deep shafts:

The safe or working load should be from one-seventh to one-fifth of the breaking strain, according to the conditions under which the rope is used; the greater the vibration and velocity of the rope, the greater should be the allowance for safety.

The weight of wire rope is about one-sixth (or .167) of a pound per cubic inch, or two pounds per foot in length per square inch section, and the proportion between the weight of a rope and its working load is as follows:

	Steel.	Charcoal Iron.
Weight per foot of rope for one ton (2000 lbs.) working load.....	$\frac{1}{8}$ lb.	$\frac{1}{2}$ lb.
Length of rope of uniform section, at which the weight of the rope is equal to its working load....	6,000 ft.	4,000 ft.

*Rule for finding the section at any point of a Taper rope of uniform strength:*

S = section of rope in inches.

W = weight of wagon, cage, etc., applied at the end of the rope.

w = weight of one foot in length of the small end of the rope.

x = distance in feet from the end at which W is applied to the section S.

e = 2.7183.

f = working or safe strain in pounds per square inch section of the rope.

= 12,000 pounds for steel.

= 8,000 pounds for charcoal iron.

$$S = \frac{W}{f} \frac{e^{wx}}{e^f - 1}$$

The weight of the rope for x feet from the end is

$$fS - W = W \left\{ \frac{e^{wx}}{e^f - 1} - 1 \right\}$$

The working load (f) is made up of the weight applied at the end of the rope (wagon, mineral cage, etc.), of the weight of the rope itself, and of the energy exerted in imparting velocity to the load. In shafts hoisting at a great speed this is an important item in the load; it is expressed by the formula,

$$\frac{W^1 V^2}{2g}, \text{ in which}$$

W<sup>1</sup> = the load in pounds.

V = increase in velocity in a second.

g = 32.2 = gravity.

If we take for example a shaft where W<sup>1</sup> = W - W<sup>0</sup> = 15,000 pounds, W<sup>0</sup> being the weight of the rope, the velocity attained in the first second = V = 10 feet, we have the energy expended in getting up this velocity,

$$\frac{W^1 V^2}{2g} = \frac{1,500,000}{64.4} = 2,329 \text{ pounds,}$$

which amount has to be added to W - W<sup>0</sup> in order to get the working strain on the rope, when we neglect the friction on the guides, the resistance of the air, rigidity of the rope, friction of sheaves on their axes, etc., which are smaller in amount, and are provided for, as is also the wear and tear of the rope, in the margin of 5 to 1 or 6 to 1, which is allowed for safety in the use of wire ropes.

## EXPENSES ON BITUMINOUS COAL TO THE ATLANTIC SEABOARD.

West Virginia Gas Coal, (Fairmont 392 miles, Clarksburg 301 miles) to Baltimore \$5.00 per ton of 2,000 lbs. Drawback allowed on shipments to Eastern ports, \$1.55 per ton.

Pennsylvania Gas Coal from Irwin or Penn Station to West Philadelphia, say 332 miles, in cars of Pennsylvania Railroad Company per 2,000 lbs., \$5.00; individual cars per 2,000 lbs., \$4.00.

West Virginia, (Kanawha) via Chesapeake and Ohio Railroad, to Richmond, say 350 miles; one cent per 2,240 lbs. per mile, (from Hawk's Nest \$3.25.) on Bituminous or Splint, and \$5.00 on Cannel.

Broad Top Semi-Bituminous, to Philadelphia, say 242 miles, \$3.55 per net ton, with a drawback of 75 cents, making toll on New York and Eastern shipments equal to \$3.15 per gross ton.

George's Creek from the mines to Cumberland, three cents per ton per mile.

George's Creek from Cumberland, Md., to Baltimore, 178 miles, \$2.05 per 2,000 lbs. and four cents per gross ton for the use of cars; from Piedmont, 206 miles, \$2.40 per 2,000 lbs.

George's Creek, by C. and O. Canal, from Cumberland to Georgetown, 184 miles, \$1.97 per ton of 2,240 lbs., to Alexandria, Va. 191 miles, \$2.08 per ton of 2,240 lbs.

From Penna. State line to South Amboy, N. J., for shipment, \$3.50 per 2,000 lbs.

Clearfield, Penn. Bituminous, from Osceola, and other stations on the Tyrone and Clearfield branch of Pennsylvania Railroad to Philadelphia, say 248 miles, \$3.55 per 2,000 lbs.; to South Amboy, 317 miles, \$4.63 per 2,000 lb. (and lateral tolls), less drawback, according to location of the collieries.

James River Coal and Carbonite, from mines to Richmond, via James River and Kanawha Canal, 52 cents per ton of 2,240 lbs.

## CHESAPEAKE AND OHIO CANAL.

The Chesapeake and Ohio Canal is 191 miles in length, extending from Cumberland, Md., to Alexandria, Va.; and 184 miles from the same point to Georgetown, D. C. It is the outlet for large quantities of the celebrated George's Creek Cumberland Coal. The canal was in order for business in the year 1850, and there were 4,042 tons of coal carried over it during that year; this had increased to 295,878 in 1860, and 604,137 in 1870, the business for 1874 being 767,064 tons. In addition to this 62,972 tons of the West Virginia Gas Coal was carried to market by this route, received at Cumberland. The boats carry about 110 tons, and take from four to five days to make the trip. The cost of transportation is \$1.97 to Georgetown, per gross ton, and \$2.08 to Alexandria; of which the master or owner receives \$1.35.

## THE WORLD'S COAL PRODUCTION.

The progress made in the production of coal in the six leading industrial countries of the world is shown in the following table, compiled in France. The figures used represent millions of tons:

	1830.	1840.	1850.	1860.	1870.	1872.
Austria.....	—	—	—	3	6	10
Belgium.....	2	4	6	10	14	16
Great Britain.....	20	34	56	85	118	132
France.....	1½	3	4½	8½	13	15
Germany.....	1½	2¾	4½	12½	26½	33
United States.....	1½	3½	5	15	39	43

These statistics show that this country ranks next to Great Britain in the production of coal, while unlike all other nations its supply is inexhaustible.



## COAL PRODUCTION OF THE GLOBE.

COMPILED BY JAMES MACFARLANE.

The following will show the coal area of the principal coal producing countries, together with the production for the years 1870, 1871, 1872 and 1873.

Square miles of Coal	1870.	1871.	1872.	1873.
Great Britain . 11,900	110,431,192	117,352,028	123,497,316	127,016,747
United States.. 192,000	32,863,690	41,000,000	45,000,000	50,512,000
Germany..... 1,800	23,316,233	37,852,463	42,324,466	45,335,741
France..... 2,086	6,550,000	13,400,000	15,899,015	17,501,000
Belgium..... 900	13,697,118	13,733,176	15,658,948	17,001,000
Austria..... 1,800	6,443,575	9,891,350	10,389,952	11,000,000
Russia..... 50,000	696,209	829,722	1,037,832	1,200,000
Spain..... 3,501	414,482	501,000	670,000	570,000
Portugal.....			18,000	18,000
Nova Scotia.... 18,000	625,769	673,242	880,950	1,051,567
Australia.....	800,000	790,143	942,510	1,000,000
India..... 2,004	500,000	500,000	500,000	500,000
*Other countries .....	1,000,000	1,000,000	1,000,000	1,000,000
	197,338,273	236,522,124	257,778,979	273,704,055

## AVERAGE CONTENTS OF COAL CARS.

The Central Railroad (of N. J.) scales at Penobscot, Luzerne Co., Pa., give the average weight of coal of each kind, and measurement of contents, as below :

Lump.....	32.2 cubic feet per ton of 2,240 pounds.
Broken.....	33.9 cubic feet per ton of 2,240 pounds.
Egg.....	34.5 cubic feet per ton of 2,240 pounds.
Stove.....	34.8 cubic feet per ton of 2,240 pounds.
Chestnut.....	35.7 cubic feet per ton of 2,240 pounds.
Pea.....	36.7 cubic feet per ton of 2,240 pounds.

## FIRST USE OF COAL AS FUEL.

The Chinese, forerunners in most discoveries, knew its value centuries ago; in their own country the Romans are known to have used it, and from the twelfth century to the present day there has been an ever increasing trade in that most important of minerals. As long ago as in Edward the Sixth's reign (1552), coal was sent to France.

## VARIETIES OF COAL.

ANTHRACITE contains eighty-five to ninety-three per cent of carbon, rarely more than seven and a half per cent of volatile matter; in the extreme western portion of the basin in Pennsylvania a Semi-Anthracite, containing as much as ten or fifteen per cent of volatile matter, has been found.

BITUMINOUS.—This is a somewhat deceptive term; it does not mean that any bitumen or mineral pitch, soluble in ether, is contained in it, but that the gases (oxygen, hydrogen and nitrogen) enter more largely into its composition than in Anthracite, and give it a more flaming character in burning.

SEMI-BITUMINOUS is that particular kind which, while it yields coke and combustible gases, usually contains eleven or twelve and never more than eighteen per cent of volatile combustible matter, and not less than seventy and never more than eighty-four per cent of carbon.

\* Italy, New Zealand, Chili, China, Japan, South America and all other countries producing lignite.

## LEHIGH VALLEY RAILROAD COMPANY.

Statement showing the coal tonnage of the Lehigh Valley Railroad Company, from the commencement of business.

Years.	Coal Tonnage		Miles of Main Road.
	East of Mauch Chunk.	Total Coal Tonnage.	
1855 (three months).....	8,482	8,482	46
1856.....	165,740	165,740	46
1857.....	418,235	418,235	46
1858.....	471,029	471,029	46
1859.....	577,651	577,651	46
1860.....	730,641	730,641	46
1861.....	743,671	743,671	46
1862.....	882,573	882,573	46
1863.....	1,195,154	1,195,154	46
1864.....	1,295,419	1,466,794	87
1865.....	1,402,276	1,687,462	87
1866.....	1,730,474	2,037,714	127
1867.....	1,948,385	2,080,156	158
1868.....	2,225,630	2,603,102	189
1869.....	2,015,296	2,310,170	189
1870.....	2,810,020	3,608,586	191
1871.....	2,210,272	2,889,074	202
1872.....	3,009,395	3,850,118	202
1873.....	3,139,023	4,144,339	202
1874.....	3,016,636	4,150,659	202

The following are the details of the business for the year ending November 30, 1874 :

## ANTHRACITE RECEIVED.

	Tons.	Cwt.
From Wyoming region.....	1,046,967	05
During the previous year.....	881,628	13
From Hazleton.....	1,986,479	06
During the previous year.....	2,123,097	17
From Upper Lehigh.....	4,733	05
During the previous year.....	2,974	15
From Beaver Meadow.....	631,630	14
During the previous year.....	629,570	18
From Mahanoy.....	475,604	05
During the previous year.....	503,802	02
From Mauch Chunk.....	5,244	15
During the previous year.....	3,265	13
Total for 1874.....	4,150,659	10
During the previous year.....	4,144,339	18

## BITUMINOUS RECEIVED.

From Pennsylvania and New York Railroad.....	4,824	06
From all other sources.....	21,797	19
Total.....	26,622	05

Grand total (Anthracite and Bituminous).....4,177,281 15

The Anthracite carried was distributed as follows:

	Tons. Cwt
Local, east of Mauch Chunk.....	72,321 18
Forwarded East, for use of Lehigh Valley Railroad.....	51,979 07
Furnaces and manufacturing companies .....	590,822 11
Berks County Railroad.....	3,624 06
Cataqua and Foglesville Railroad.....	9,351 00
East Pennsylvania Railroad.....	25,000 14
North Pennsylvania Railroad.....	293,445 14
Port Delaware.....	165,277 07
Eastern and Amboy Railroad.....	.....
Morris and Essex Railroad.....	401,403 11
Belvedere and Delaware Railroad.....	1,106,476 10
New Jersey Central Railroad.....	358,633 12
At and above Mauch Chunk, for use of Lehigh Valley Railroad.....	66,019 07
Pennsylvania and New York Railroad.....	569,718 06
Northern Central Railroad.....	15,164 14
Danville, Hazleton and Wilkesbarre Railroad.....	53,553 13
Lehigh and Susquehanna Railroad, at Packerton, for railroad	13,064 09
Individuals at Mauch Chunk.....	2,233 17
Individuals above Mauch Chunk.....	15,472 13
Lehigh and Susquehanna Railroad, at Penn Haven, for railroad.....	2,845 19
Lehigh and Susquehanna Railroad, at Penn Haven, for canal	225,650 00
Lehigh Canal, Mauch Chunk.....	95,664 12
Catawissa Railroad.....	2,933 08
Lackawanna and Bloomsburg Railroad, at Lackawanna Junction	70,782 02
Philadelphia and Reading Railroad.....	890 03
Total.....	4,150,659 10

### SHIPMENTS AT PORT RICHMOND.

The business at Port Richmond for the year ending November 30 1874, was as below:

RECEIPTS.		SHIPMENTS.	
	Tons. Cwt.		Tons. Cwt.
Anthracite.....	2,159,492 17	Anthracite.....	2,008,495 16
Bituminous.....	43,002 12	Bituminous.....	42,631 18
Total.....	2,202,425 09	Total.....	2,051,127 14
DESTINATION.			
	Tons. Cwt.		Tons. Cwt.
Nova Scotia.....	22,076 00	Brought forward.....	1,863,274 09
Canada.....	829 00	District of Columbia.....	69,500 10
New Brunswick.....	12,461 10	Virginia.....	63,853 10
Maine.....	104,212 00	North Carolina.....	4,898 10
New Hampshire.....	52,214 10	South Carolina.....	20,747 05
Vermont.....	267 00	Georgia.....	11,872 00
Massachusetts.....	952,938 10	Alabama.....	1,440 00
Rhode Island.....	105,650 00	Louisiana.....	503 00
Connecticut.....	50,994 00	Florida.....	15,547 00
New York.....	376,904 15	Texas.....	1,562 00
New Jersey.....	82,013 14	West Indies.....	10,032 00
Pennsylvania.....	75,067 00	Central America.....	2,422 00
Delaware.....	7,512 10	South America.....	119 10
Maryland.....	20,134 00	Mexico.....	351 00
Carried forward.....	1,863,274 09	Total.....	2,051,127 14



## PHILADELPHIA AND READING RAILROAD COMPANY.

The following table will show the progress in the number of tons of 2240 pounds carried by this company, and the number of miles of main line in operation, from 1850 to 1874, inclusive :

Date.	Tons.	Miles.	Date.	Tons.	Miles.
1850.....	1,351,502	95	1871.....	6,002,573	260
1853.....	2,213,292	98	1872.....	6,185,434	323
1860.....	1,946,195	152	1873.....	6,546,553	323
1865.....	3,090,814	152	1874.....	6,318,812	323
1870.....	4,633,504	152			

Details for the year ending November 30, 1874, are as below :

	Tons.	Cwt.
Passing over main line .....	4,005,690	01
For shipment by Schuylkill Canal .....	720,052	05
Shipped westward .....	249,932	19
Shipped West or South .....	102,110	02
Consumed on laterals .....	175,399	09
Lehigh and Wyoming coal .....	490,572	09
Bituminous .....	257,243	08

Total all kinds paying freight .....

Coal for company's use :

Anthracite .....	336,132	06
Bituminous .....	11,679	08

Total .....

The coal was received from the lateral roads as follows :

	Tons.	Cwt.
At Port Carbon .....	1,753,302	04
At Mount Carbon .....	160,177	00
At Schuylkill Haven .....	1,330,892	07
At Pine Grove .....	330,602	02
At Tamaqua .....	638,649	15
At Harrisburg and Dauphin .....	207,362	19
At Allentown and Alburtis .....	24,736	12
At Orelan and Willow Street .....	55,453	11
At Summit and Rupert .....	410,382	06
Bituminous, at Harrisburg .....	268,922	16
Coal for Canal .....	720,052	05
Shipped West, via N. C., etc. ....	270,800	11
Consumed on laterals .....	175,399	09

Total business of the company .....

The coal was distributed as follows :

Years.	Line.	Philadelphia.	Port Richmond.
1863.....	548,755	388,352	2,128,154
1864.....	634,074	373,070	2,058,423
1865.....	659,376	380,283	2,051,202
1866.....	836,598	475,189	2,402,897
1867.....	935,694	386,933	2,121,189
1868.....	597,903	697,277	2,113,581
1869.....	923,504	888,633	2,362,972
1870.....	1,074,400	785,535	1,893,055
1871.....	1,128,227	923,539	2,311,393
1872.....	1,357,203	998,212	2,223,137
1873.....	1,670,188	1,075,255	2,266,892
1874.....	1,715,052	1,064,804	2,076,259

## LEHIGH COAL AND NAVIGATION COMPANY.

TABLE SHOWING THE COAL PRODUCTION AND SHIPMENTS OF THIS COMPANY.

YEAR.	TONS.	YEAR.	TONS.
1820.....	365	1847.....	351,675
1821.....	1,073	1848.....	360,619
1822.....	2,440	1849.....	393,807
1823.....	5,823	1850.....	424,258
1824.....	9,541	1851.....	480,824
1825.....	28,393	1852.....	510,406
1826.....	31,280	1853.....	496,905
1827.....	27,770	1854.....	544,811
1828.....	33,150	1855.....	449,812
1829.....	25,110	1856.....	400,425
1830.....	43,000	1857.....	401,751
1831.....	44,500	1858.....	425,896
1832.....	77,292	1859.....	546,816
1833.....	124,508	1860.....	517,157
1834.....	106,500	1861.....	410,877
1835.....	131,250	1862.....	241,837
1836.....	146,738	1863.....	517,259
1837.....	200,000	1864.....	517,180
1838.....	164,693	1865.....	517,025
1839.....	142,507	1866.....	400,000
1840.....	102,264	1867.....	370,204
1841.....	78,164	1868.....	453,821
1842.....	163,762	1869.....	563,914
1843.....	138,806	1870.....	468,272
1844.....	219,245	1871.....	762,682
1845.....	257,740	1872.....	1,014,890
1846.....	284,813	1873.....	1,081,153

The business of this company for 1874, is merged into that of the Lehigh and Wilkesbarre Coal Co., which is its successor.

## WILKESBARRE COAL AND IRON CO.,

The shipments of this company have been as below :

1869.....	502,485	1872.....	1,168,716
1870.....	769,226	1873.....	1,278,307
1871.....	950,754		

The business of this company for 1874, is merged into that of the Lehigh and Wilkesbarre Coal Co., its successor.

## LEHIGH AND WILKESBARRE COAL CO.

Report of coal shipped by Lehigh and Wilkesbarre Coal Company, for the year ending December 31, 1874.

	Gross tons, of 2,240 lbs.
Wilkesbarre shipments.....	1,356,610 18
Lehigh shipments.....	587,407 06
Audenried shipments.....	525,363 09
Total.....	2,470,381 13

## PENNSYLVANIA AND NEW YORK RAILROAD.

Report of coal carried for year ending November 30, 1874.

Anthracite.....	714,030 09
Bituminous.....	302,717 02
Total.....	1,016,747 11

The Anthracite was received from—

Lehigh Valley Railroad.....	569,718 06
Lackawanna and Bloomsburg Railroad.....	53,224 07
Pleasant Valley Branch.....	57,506 01
Sullivan and Erie Railroad.....	33,491 15

The Bituminous was received from—

Barclay Railroad.....	302,258 06
Northern Central Railroad.....	458 16

The Anthracite was delivered to—

Lehigh Valley Railroad.....	24 15
Lackawanna and Bloomsburg Railroad.....	393 02
Southern Central Railroad.....	172,898 06
Ithaca and Athens Railroad.....	216,261 05
Erie Pockets for shipment.....	214,096 12
Erie, Watkins direct.....	23,300 18
Individuals on line.....	26,796 02
Used by company.....	26,964 01
Between Waverly and Elmira.....	33,295 08

The Bituminous was delivered to—

Erie Railway.....	199,862 05
Southern Central Railroad.....	54,234 19
Ithaca and Athens Railroad.....	40,866 17
Lehigh Valley Railroad.....	4,824 06
Individuals on line.....	2,493 01
Used by company.....	435 14

The business for the year ending November 29, 1873, was as follows:

Anthracite.....	685,373 15
Bituminous.....	294,868 05
Total.....	980,242 00

## MORRIS AND ESSEX RAILROAD.

The following is the business of this branch of the Delaware, Lackawanna and Western Railroad Company:

Years.	Way.	Through.	Total.
1867.....	99,559	183,662	243,221
1868.....	146,820	300,219	447,039
1869.....	192,217	360,666	552,283
1870.....	191,209	655,292	846,500
1871.....	202,052	652,954	855,006
1872.....	137,708	794,648	932,356
1873.....	313,414	1,352,384	1,665,798
1874.....	356,559	1,085,590	1,442,149



## MORRIS CANAL.

This canal extends from Phillipsburg, N. J., on the Delaware River, to Jersey City, on the Hudson—101 miles.

The following is a statement of the coal business of the canal since 1845, furnished by J. F. Randolph, Supt. This canal is now leased and operated by the Lehigh Valley Railroad Co.

Year.	Lehigh.	Scranton.	Year.	Lehigh.	Scranton.
1845.....	12,567	.....	1860.....	276,947	127,517
1846.....	41,142	.....	1870.....	275,458	34,385
1847.....	61,951	.....	1871.....	246,269	69,350
1848.....	82,159	.....	1872.....	271,591	70,392
1849.....	103,482	.....	1873.....	245,622	55,292
1850.....	98,100	.....	1874.....	215,490	52,115

## PENNSYLVANIA RAILROAD.

## UNITED RAILROADS OF NEW JERSEY DIVISION.

The following shows the business of this branch of the Pennsylvania Railroad:

	Through.	Way.	Total.
1874.....	899,503	328,405	1,227,908
1873.....	794,865	360,467	1,155,332
1872.....	877,614	87,989	965,553
1871.....	563,093	69,334	632,427
1870.....	632,667	81,910	714,277
1869.....	455,684	72,538	528,223
1868.....	312,228	19,065	33,292
1867.....	269,738	18,586	288,321
1866.....	174,508	13,554	188,062
1865.....	202,781	11,535	214,345
1864.....	161,268	13,095	174,303
1863.....	.....	.....	130,494
1862.....	.....	.....	129,452
1861.....	.....	.....	145,917
1860.....	.....	.....	146,308
1859.....	.....	.....	135,205
1858.....	.....	.....	99,000
1857.....	.....	.....	123,248

The business for the year 1874 was as follows:

Coal Port for shipment.....	259,742
South Amboy for shipment.....	630,760
Distribution for consumption.....	288,202
Use of company.....	40,203

1,227,908

This was received from the following sources:

From Lehigh.....	964,129
From Wyoming.....	263,779

There was actually shipped.

At Coal Port.....	267,854
At South Amboy.....	620,561

## CENTRAL RAILROAD OF NEW JERSEY.

## LEHIGH AND SUSQUEHANNA BRANCH.

Report of coal received for the year ending December 31, 1874.

FROM	TONS.
Wyoming region.....	1,519,589 11
Upper Lehigh region.....	221,192 07
Beaver Meadow region.....	420,865 19
Hazleton region.....	238,694 00
Mauch Chunk region.....	571,945 01
Total.....	2,972,286 18

This was distributed as follows :

Forwarded East by rail, tidal points.....	1,377,867 12
Forwarded East by rail, local points.....	456,496 05
Forwarded East by rail, use Central Division.....	97,338 17
Forwarded East by rail, use Lehigh and Susquehanna.....	11,173 12
At Coalport for canal.....	726,765 18
At and above Mauch Chunk.....	107,967 02
To Lehigh Valley Railroad at Packerton.....	31,493 13
To Lehigh Valley Railroad at Sugar Notch :.....	109,868 04
To Lackawanna and Bloomsburg.....	53,315 15
Total.....	2,972,286 18
For previous year.....	3,089,697 19

## LEHIGH CANAL COAL TRADE.

Report of coal carried through the Lehigh Canal for the year 1874.

Mauch Chunk region.....	155,935 15
Mauch Chunk region (Hazardville).....	27,151 04
Beaver Meadow region.....	160,661 11
Mahanoy region.....	40,728 00
Hazleton region.....	226,887 18
Upper Lehigh.....	33,530 08
Wyoming region.....	147,887 11
Total.....	792,783 07
Same time last year.....	736,251 14

## LACKAWANNA COAL TRADE.

## DELAWARE, LACKAWANNA AND WESTERN RAILROAD.

Report of coal tonnage for the year ending December 31, 1874.

Shipped North.....	783,793 12
Shipped South.....	1,786,643 09
Total.....	2,570,437 01
Same time 1873.....	3,136,298 16

## DELAWARE AND HUDSON CANAL COMPANY.

Report of coal mined for year ending December 31, 1874.

Forwarded North.....	2,341,348 12
Forwarded South.....	58,068 17
Total.....	2,399,417 09
Same time 1873.....	2,752,595 11

## PENNSYLVANIA COAL COMPANY.

Report of coal mined for year ending December 31, 1874.

Total for the year.....	1,338,663 13
Same time 1873.....	1,239,214 05

From their organization these companies have mined:

	D. & H. C. Co.	P. C. Co.	D. L. & W. R. R.
1829.....	7,000	.....	.....
1830 to 1839.....	846,323	.....	.....
1840 to 1849.....	2,897,981	.....	.....
1850 to 1859.....	4,838,855	4,834,723	2,629,364
1860 to 1869.....	10,098,691	7,249,820	13,343,126
1870.....	2,039,722	3,086,008	2,348,097
1871.....	1,366,471	802,039	1,916,486
1872.....	2,930,767	1,213,478	2,836,948
1873.....	2,752,595	1,239,214	3,136,306
1874.....	2,399,417	1,338,663	2,570,437

## SHAMOKIN, LYKENS VALLEY, ETC.

We find that in 1839, 11,390 tons of coal were shipped by the Northern Central Railroad, from Shamokin, and up to 1870 there had been sent 4,802,533 tons.

In 1870.....	486,174 tons.
In 1871.....	628,866 tons.
In 1872.....	569,689 tons.
In 1873.....	635,383 tons.
In 1874.....	583,723 tons.

We next find in 1849, 25,335 tons of coal were sent from the Lykens Valley, Short Mountain, and up to 1870 there had been sent 2,619,623 tons.

In 1870.....	67,775 tons.
In 1871.....	94,183 tons.
In 1872.....	50,931 tons.
In 1873.....	50,248 tons.

The Big Lick colliery commenced in 1870, and had mined 237,004 tons of coal to the beginning of 1872.

In 1872.....	138,303 tons.
In 1873.....	107,585 tons.

## CHESAPEAKE AND OHIO RAILROAD.

Report of coal received from mines for the year ending December 31, 1874:

Cannel Coal.....	26,223
Splint Coal.....	114,605
Coke.....	1,930
Total.....	141,760



## COAL PRODUCTION DURING 1874.

We are enabled to give the following details relative to the Anthracite coal trade during the year 1874 :

## WYOMING.

Forwarded by Pennsylvania Canal.....	321,374 tons.
Forwarded by Pennsylvania Coal Co.....	1,338,663 tons.
Forwarded by Delaware, Lackawanna and Western Railroad.....	2,502,769 tons.
Forwarded by Delaware and Hudson Canal Co.....	2,399,417 tons.
Forwarded by Lackawanna and Bloomsburg Railroad.....	432,646 tons.
Forwarded by Lehigh Valley Railroad.....	940,987 tons.
Forwarded by Central Railroad of New Jersey.....	1,519,590 tons.

Total for 1874.....9,455,446 tons.

## SCHUYLKILL.

Forwarded by Philadelphia and Reading Railroad.....	4,671,113 tons.
Shamokin coal.....	583,723 tons.
Lykens Valley coal.....	637,828 tons.

Total for 1874.....5,891,666 tons.

## LEHIGH.

Forwarded by Lehigh Valley Railroad.....	3,152,651 tons.
Forwarded by Central Railroad of New Jersey.....	1,210,662 tons.
Forwarded by D. H. & W. Division of Pennsylvania Railroad.....	40,687 tons.

Total for 1874.....4,404,000 tons.

## SULLIVAN AND ERIE.

For the year 1874.....	33,896 tons.
For the year 1873.....	35,267 tons.
For the year 1872.....	51,966 tons.
For the year 1871.....	24,665 tons.

This would give a total of 19,785,008 tons for the year 1874, as compared with 19,585,178 tons in 1873. In addition perhaps 3,000,000 tons were used in each year in the vicinity of the collieries, that is not reported by the mining companies.

## COAL AT SAN FRANCISCO, CAL.

The following gives the comparative imports for—

	1873. Tons.	1874. Tons.	Increase. Tons.	Decrease. Tons.
Foreign.				
Australian.....	96,435	199,109	42,664	.....
English.....	52,616	37,826	.....	14,790
Vancouver.....	31,435	51,617	19,582	.....
Chili.....	400	.....	.....	400
Japan.....	50	.....	.....	50
Eastern.				
Anthracite.....	18,295	14,263	.....	4,032
Cumberland.....	8,857	15,475	6,618	.....
Domestic.				
Mt. Diablo.....	171,741	206,255	34,514	.....
Coos Bay.....	38,066	41,857	6,791	.....
Bellingham Bay.....	21,211	13,685	.....	7,526
Seattle.....	13,572	9,027	.....	4,545
Rocky Mountain.....	1,904	433	.....	1,471
Totals.....	454,582	531,947	110,179	32,814

—San Francisco Commercial Herald.

## THE PROGRAMME FOR 1875.

We have somewhat delayed the publication of this work in order to bring in the plan of operations decided upon for the year 1875, although there is nothing definitely agreed upon as yet, sufficient has been made public, that we may safely say that the main points are:

The abrogation of season contracts.

No sales of coal at auction.

Prices to be made each month based upon the then demand for coal.

Tonnage to competing places, in same ratio as during 1874.

The opening prices, for the month of March, 1875, have been fixed as follows:

## READING CO'S COAL AT PHILADELPHIA.

	Lump.	St. Boat.	Broken.	Egg.	Stove.	Chest.
Hard White Ash Coal.....	\$3 90	\$4 00	\$4 10	\$4 25	\$4 80	\$3 50
Free-burning White Ash Coal... 3 90	4 00	4 10	4 25	4 80	3 50	
Schnylkill Red Ash Coal.....	....	4 25	4 40	4 85	3 75	
Shamokin Coal.....	....	.....	4 40	4 85	3 85	
Lorberry Coal.....	....	4 85	4 85	4 85	3 85	
LEHIGH COAL EXCHANGE..... 5 25	....	4 85	4 85	5 30	4 50	
D. L. & W. Scranton.....	} 4 40	4 50	4 60	4 75	5 30	4 35
D. & H. Co., Lackawanna.....						
L. & W. Co., Wilkesbarre.....						

The Pennsylvania Coal Company act independently as heretofore.

## BALTIMORE, MD.

Under date of March 1st, 1875, the Baltimore and Ohio Railroad reduced their charges on coal to Baltimore, twenty-five cents per ton, making rates from—

Cumberland to Locust Point.....\$2 05

Piedmont to Locust Point..... 2 40

Newburg to Locust Point..... 4 25

Clark-burg and Farmount to Locust Point..... 4 75

per ton of 2000 lbs., with a drawback off Gas coal reshipped North and East. (See pages 38 and 87.)

## LIST OF COLLIERIES IN THE CLEARFIELD, PA., REGION.

Moshannon colliery..	Moshannon Coal Co.	Reading colliery.....	J. P. Hale & Co.
Eureka colliery..	} Berwind, White & Co.	Derby colliery.....	Derby Coal Co.
Mapleton colliery)		Decatur colliery.....	Decatur Coal Co.
Sterling colliery..	} R. H. Powel & Co.	Morrisdale colliery....	R. B. Wigton.
Powellton colliery)		Webster.....	S. W. Thomas & Co.
Franklin colliery.....	Kittaning Coal Co.	(no name).....	Whitehead & Jacobs.
Penn colliery....	Himes, Mentzer & Co.	Laurel Run colliery....	J. M. Bacon.
Enterprise.....	W. A. Orbison.	Logan colliery.....	Logan Coal Co.
Estimated capacity, 5000 tons, daily.			

## COMBUSTION OF COAL.

The following Table, showing the weight per cubic foot, space required to stow, the constituent parts, the pounds of steam raised, is from experiments made by Prof. Walter R. Johnson, for the Navy Department of the United States, in 1842, and comprises all the coals then in use; no such complete statement has since been prepared.

DESIGNATION OF COAL.	Weight per cu. ft.	Cu. ft. of space to stow a ton.	Volatile combustible matter.	Fixed carbon.	Earthy matter.	Lbs. of steam to 1 of coal from 212°.
Beaver Meadow, slope No. 3, (Pa.).....	54.93	40.78	2.38	88.94	7.11	9.21
Beaver Meadow, slope No. 5, (Pa.).....	56.19	39.86	2.66	91.47	5.15	9.88
Forest improvement, (Pa.).....	53.66	41.75	3.07	90.75	4.41	10.06
Peach Mountain, (Pa.).....	53.79	41.64	2.96	89.02	6.13	10.11
Lehigh, (Pa.).....	55.32	40.50	5.28	89.15	5.56	8.93
Lackawanna, (Pa.).....	48.89	45.82	3.91	87.74	6.35	9.79
Lyken's Valley, (Pa.).....	48.56	46.13	6.88	83.84	9.25	9.46
Beaver Meadow. [Navy Yard] (Pa.).....	55.08	40.65	.....	.....	8.10	9.08
Natural coke of Virginia, (Va.).....	46.64	48.03	12.44	75.08	11.83	8.47
Coke of Midlothian coal, (Va.).....	32.70	68.50	.....	.....	16.55	8.63
Coke of Neff's (Cumberland) coal, (Va.).....	31.57	70.95	.....	.....	13.34	9.00
Mixture 1-5 Cumberl'd & 4-5 Bv. Meadow....	54.29	41.26	.....	.....	8.88	8.86
Mixture 1-5 Cumberl'd & 4-5 Bv. Meadow....	51.51	41.09	.....	.....	8.18	9.18
New York & Maryland Mining Co's, (Md.).....	53.70	41.71	12.31	73.50	12.40	9.78
Neff's Cumberland, (Md.).....	54.29	41.26	12.67	74.53	10.34	9.44
Easby's "coal in store," (Md.).....	53.47	41.90	14.98	76.26	8.08	10.02
Atkinson & Templeman's, (Md.).....	52.92	42.33	15.53	76.69	7.33	10.70
Easby & Smith's.....	51.16	43.78	15.52	74.29	9.30	9.96
Cumberland [Navy Yard], (Md.).....	53.29	42.04	14.87	70.85	14.98	.....
Dauphin and Susquehanna, (Pa.).....	50.54	44.32	13.82	74.24	11.49	9.34
Blossburg, (Pa.).....	53.05	42.22	14.78	73.11	10.88	9.72
Lycoming Creek, (Pa.).....	55.38	40.45	13.84	71.53	13.96	8.91
Quinn's Run, (Pa.).....	50.34	44.50	17.97	72.79	8.41	10.57
Kirthaus, (Pa.).....	52.54	42.63	19.53	73.77	7.00	9.09
Cambria County, (Pa.).....	58.46	41.90	20.52	69.37	9.15	9.24
Barr's Deep Run, (Va.).....	53.17	42.13	19.78	67.96	10.47	9.02
Crouch & Snead's, (Va.).....	53.59	41.80	24.38	59.98	14.28	8.34
Midlothian [900 feet shaft], (Va.).....	50.52	44.34	27.28	61.08	10.47	8.58
Creek Company's Coal, (Va.).....	46.50	48.17	32.47	60.30	8.57	8.42
Clover Hill, (Va.).....	45.49	49.25	32.21	56.83	10.13	7.67
Chesterfield Mining Company's, (Va.).....	45.55	49.18	32.63	58.79	8.63	9.00
Midlothian [average], (Va.).....	54.04	41.45	29.86	53.01	14.74	8.29
Tippecanoe, (Va.).....	45.10	49.67	34.54	54.62	9.37	7.75
Midlothian [new shaft], (Va.).....	47.90	46.76	35.77	56.40	9.44	8.75
Midlothian [screened], (Va.).....	45.72	48.99	34.70	54.06	9.66	8.94
Midlothian [Navy Yard], (Va.).....	54.47	41.13	29.12	56.11	14.14	.....
Pictou [from New York], (N. S.).....	53.55	41.83	27.83	56.98	13.39	8.41
Sidney, (N. S.).....	47.44	47.22	23.81	67.57	5.49	7.99
Pictou [Cunard's], (N. S.).....	49.25	45.48	25.97	60.74	12.51	8.48
Liverpool, (Eng.).....	47.88	46.78	39.96	54.90	4.62	7.48
Newcastle, (Eng.).....	50.82	44.08	35.83	57.00	5.40	8.66
Scotch, (Scotland).....	51.09	43.84	39.19	48.81	9.34	6.95
Pittsburgh, (Pa.).....	46.81	47.85	36.76	54.93	7.07	8.20
Cannelton, (Ind.).....	47.65	47.01	33.99	58.44	4.97	7.34
Dry Pine Wood.....	21.01	166.02	.....	.....	0.30	4.69



## PENNSYLVANIA.

## STATISTICS OF BITUMINOUS COAL PRODUCT FOR 1874.

Blossburg (Semi-Bituminous).....	762,716
Mc Intyre       “.....	138,907
Towanda       “.....	387,072
<b>Total Northern Pennsylvania.....</b>	<b>1,238,695</b>
Snowshoe (Semi-Bituminous).....	63,540
Clearfield       “.....	639,630
Broad Top       “.....	226,693
<b>Total Central Pennsylvania.....</b>	<b>929,863</b>
Alleghany Mountain Region.....	208,212
West Pennsylvania.....	240,177
Southwest Pennsylvania.....	438,620
Westmoreland Gas Coal.....	952,971
Pittsburgh Coal.....	514,010
Johnstown Iron Works.....	200,000
<b>Total on line of Pennsylvania Railroad.....</b>	<b>2,553,990</b>
Philadelphia and Erie.....	200,000
Alleghany Valley.....	229,326
Erie and Pittsburgh (block coal).....	260,972
Lawrence Railroad.....	25,000
Newcastle and Beaver.....	25,000
Jamestown and Franklin.....	25,000
Little Saw Mill Run Railroad.....	87,637
Pittsburgh and Castle Shannon.....	136,227
Pittsburgh and Connellsville.....	4 3,975
Pittsburgh, Charleston and West Virginia.....	37,500
Pittsburgh, Cincinnati and St. Louis.....	576,222
Shenango and Alleghany Railroad.....	25,000
Pittsburgh, Fort Wayne and Chicago.....	194,673
Monongahela Navigation Co.....	2,542,294
Local at Pittsburgh, not carried by rail or water (carted to works in city).....	100,000
Kelung & Co., Pittsburgh.....	147,546
Wetting H & Gormley.....	11,877
J. W. Carlin & Co.....	3,817
<b>Total for Western Pennsylvania.....</b>	<b>5,030,067</b>
Used by railroads not in above.....	500,000
Mined on rivers not in above.....	500,000
Mined at country pits for furnaces, salt works, etc.....	300,000

Total for the State of Pennsylvania.....11,053,615 tons of 2000 pounds.

In the Blossburg product noted above we do not include 33,672 tons "home consumption."  
 The Towanda product includes 100,219 tons from the Schreder mines.

A Circular issued March 15, gives notice of a reduction in the Freight on Semi-Bituminous Coal, via the Pennsylvania Railroad, of twenty-five cents per 2000 pounds. See the table of "Expenses on Bituminous Coal to the Atlantic Seaboard."

THE ATTENTION OF CONSUMERS OF COAL is invited to the card of MEEKER & DEAN, which appears in another portion of this work; among the coals offered by them, we find, the

LACKAWANNA VALLEY.—This coal is mined in the Lackawanna Valley, and is a peculiarly useful fuel for domestic purposes, being free burning, yielding a white ash.

KINGSTON.—This popular coal is mined from the Baltimore Vein, in the Wyoming Valley, is free burning, and gives a white ash. It is prepared with especial care for domestic use, and is not excelled for generating steam.

WYOMING RED ASH.—FROM THE CHAUNCEY MINE. The universal favorite, and in all respects the best red ash coal in market from this well known locality.

CROSS CREEK LEHIGH.—Red Ash, a lasting and economical fuel for Steamers, Sugar Refineries, and Factory use generally.

BEAVER BROOK LEHIGH.—Founders and Machine Shops, wanting a hard, bright coal, for special service in working iron, should give this variety a trial.

The proprietors inform us that all these coals are forwarded in good order, free from impurities.

The attention of Railroad and Mining Companies is invited to the economical Shovel, manufactured by the AMERICAN SHOVEL COMPANY, at Nos. 118, 120, 122 PLYMOUTH STREET, BROOKLYN, N. Y. Lowman's Patent Solid Steel and Iron SHOVELS, SPADES AND SCOOPS of every description, without Straps or Rivets, from the very best brands of English and American materials.

SAML. BONNELL, JR., Prest.

GEO. TUTHILL, Secy.

THOS. KECK, Vice-Prest.

C. B. SHOEMAKER, Treas.



---

 GEORGE'S CREEK CUMBERLAND COAL.
 

---

 THE NEW CENTRAL COAL COMPANY'S MINES.
 

---

Experiments were made by the Superintendent of the United States Armory at Springfield, Mass., during 1873, to test the value of certain coals as steam generators with the following results:

	Lackawanna.	Pittston.	Cumberland.
Pound per h. p. per hour.....	4.01	4.02	3.33
Cost per gross ton.....	\$3.05	\$1.85	\$9.10
Cost per horse power.....	15-10 cts.	14-10 cts.	12-10 cts.

Each variety was used for six consecutive days; and it is therefore alleged that bituminous coal from the Cumberland region is the most economical fuel as a steam generator, making more heat and creating more power per pound, and per cent, of cost than the harder coal.

The reputation of the 14 feet George's Creek vein of Cumberland coal is now fully established, and it is conceded to be unequalled for steam generating purposes. It is supplied to every European and coastwise steamer which leaves this port; to almost every railroad, not only in New York, but through the Eastern, Middle, and some of the Southern States. It is burned upon most of the ferry boats, and a great number of the factories, foundries, glass works, etc., in New England and New York. Its superiority for all these various purposes of manufacture and commerce is so generally conceded that the demand is steadily increasing.

The lands and mines of the *New Central Coal Company* are located in the heart of the region, and comprise between three and four thousand acres, on which openings have been already made, developing 1,100 acres of the fourteen foot bed, the coal from which has proved itself the very best in the Cumberland region. The facilities of the Company are among the best, and their rank as producers is shown in the fact that for three years past they have sold and delivered an average of 225,000 tons each year.

The Company solicit orders from consumers in coal for steam raising, and will continue to furnish first-class coal, shipped either from Baltimore, Md.; Georgetown, D. C.; or Hoboken, N. J.

Prompt deliveries may be relied upon.

The Offices of the *New Central Coal Company* are at Rooms 6 and 6½ Trinity Building, 111 Broadway, New York.

HARRY CONRAD, President.

E. J. STERLING, Vice President.

P. C. CALHOUN, Treasurer.

WM. S. JACQUES, Secretary.

ALEXANDER SHAW, General Manager.

---

 SALES AGENTS:

S. C. THWING & Co.,

ISAAC T. HOTCHKISS,

77 State Street,

111 Broadway,

Boston, Mass.

New York.



## Kittaning Coal.

Bituminous coals as rapid steam generators are steadily gaining favor among steam-vessel owners and manufacturers, and it is very gratifying that such is the case. Shipments to South America and the West Indies are of frequent occurrence, while many of our ocean craft that formerly used English soft coals and American hard coals are adopting Cumberland and Kittaning coals.

As in the introduction of everything new—and the use of bituminous coals was in a great measure new to most of the Northern steam-users and factories—intense opposition was at first met; they were objected to as being dirty and smoky; and the supply in the Northern market was was fluctuating and uncertain. At last, however, we have seen the advocacy of American bituminous coals triumphantly justified; they have been proved to excel the common, and quite equal the very best varieties of anthracite in their heating power; when properly used, they give rise to little or no offensive smoke, and under the judicious management of the mining companies, the market supply is more regular and the prices less fluctuating than those of anthracite.

The steamships of the Red Star Line, of Philadelphia, are now supplied with the Kittaning coal, and we have the testimony of the Chief Engineer, to the effect that it is equal to the best English coal he has ever used.

Such being the results reached by a practical test of this coal, a comparison between its constituents and those of the best English coal becomes a matter of deep interest. According to an analysis made by the well-known chemist, Prof. Charles A. Seeley, the composition of coal from the Excelsior vein, which is worked on the property of the Kittaning Company, is as follows:

Volatile combustible matter.....	20.10
Fixed carbon.....	76.39
Ash.....	3.51

while the constituents of Newcastle coal (English) are:

Volatile combustible matter.....	33.55
Fixed carbon.....	61.70
Ash.....	3.75
Moisture.....	.99

The Kittaning Coal Co are now owners of large tracts of coal lands in the semi-bituminous coal districts of Pennsylvania; their product is large, and the satisfaction given by their coal last year is matter of congratulation to the Company, and the users of the fuel.

The main offices of the Company are at 125 South Fourth street, Philadelphia.

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## **Hampshire and Baltimore Company's**

### **GEORGE'S CREEK CUMBERLAND COAL.**

---

The superiority of this variety of fuel for steam raising is acknowledged by all authorities: working tests demonstrate the fact that it is fully twenty per cent cheaper, by reason of its calorific power, than anthracite; the price being equal.

The Hampshire Company's mines are located on the celebrated fourteen foot bed of this coal region; their annual product shows that they take front rank with the producers, and the markets secured by the Company (to the West Indies, South America and the Canadian Provinces), furnish evidence of its quality and efficiency.

Shipments are made from either Alexandria, Va., or Baltimore, Md.

Alexandria, Va., offers superior facilities for loading coal, on account of the depth of water to be found at the shipping wharves; vessels of almost any draft may be loaded promptly,

The coal from the mines of this Company is mined and shipped with care to secure the desirable feature of "lumpiness."

Orders may be addressed to the home office in Baltimore, or to the New York and Boston branches.

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## **West Virginia Gas Coal.**

---

The coal from the Monongahela Company's mines, located at Wilsonburg, in Harrison county, West Virginia (305 miles west from Baltimore), finds an outlet to market via the Baltimore and Ohio Railroad. During the year past it has been in use in several of the largest Gas Light companies of our Eastern cities, and the result of these practical working tests is most flattering; the yield of gas ranged from 10,000 to 10,500 cubic feet per gross ton of coal; the illuminating power from  $16\frac{1}{2}$  to  $17\frac{1}{2}$  standard candles, and the coke was good in both quantity and quality.

As a fuel the value of this coal ranks with the best Pittsburgh; one pound of coal evaporates 14.41 pounds of water; the ashes are grey, and consist chiefly of alumina; with silica, and as they contain but little iron, do not readily form a clinker.

*Yale & Newton*  
*Compliments of the Author*

# THE COAL TRADE.

A COMPENDIUM OF VALUABLE INFORMATION

RELATIVE TO

COAL PRODUCTION, PRICES, TRANSPORTATION, ETC., AT  
HOME AND ABROAD, WITH MANY FACTS  
WORTHY OF PRESERVATION FOR  
FUTURE REFERENCE.

*CORRECTED TO THE LATEST DATES.*

BY

FREDERICK E. SAWARD,

*EDITOR OF THE "COAL TRADE JOURNAL."*

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1876.

PUBLISHED AT 111 BROADWAY, NEW YORK.

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# THE COAL TRADE.

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## INTRODUCTION.

We present our readers with further intelligence on the important subject of coal, and ask for it a continuance of the cordial reception awarded the previous editions.

Within the year 1875, the production of Anthacite coal in America was slightly less than during the year 1874, owing to a "strike" of five month's duration—that the decrease is not larger is owing to the facilities for mining. We can now produce in six or eight months as much as was formerly produced in any given year. The Bituminous districts of Pennsylvania show a slight increase, all the other states hold about their own, although it is estimated that if we should have anything like the revival of industrial pursuits, with prosperity to the country at large, the coal product and consumption could be increased at the rate of ten per cent. per annum.

In Great Britain, and in fact in most of the foreign countries, the production has decreased, or there is but little increase, while wages and prices of coal show a marked decline. We still maintain the proud position of former years as a coal producing country, the output keeping at about fifty million tons; the Anthracite being twenty-two million tons, Bituminous and Semi-Bituminous twenty seven millions, while Colorado, Wyoming, Utah and the Pacific slope give 1,000,000 tons of *Lignite* or Brown coal annually. The Anthracite trade of the United States is profitable, as it could not fail to be, while the present organization lasts, whereby it is possible for a few companies to own or control the entire output. The Bituminous trade is fairly profitable, and the trade is being extended, taking up the increased demand that there is for fuel.

## ANTHRACITE COAL.

Anthracite coal is found in an area of about 470 square miles, in Luzerne, Carbon, Schuylkill, Northumberland, Dauphin, and Columbia counties, in the State of Pennsylvania.

We append the following schedule of the production :

Year.	Tons.	Year.	Tons.
1820.....	365	From 1860 to 1870.....	114,319,161
From 1820 to 1830.....	533,194	1871.....	15,198,663
From 1830 to 1840.....	5,940,270	1872.....	18,929,263
From 1840 to 1850.....	21,893,153	1873.....	19,585,173
From 1850 to 1860.....	63,981,897	1874.....	19,785,038

There are three great divisions—which are named from their locations—the first or Southern, the second or Middle, and the third or Northern coal fields.

The Southern coal field lies principally in Schuylkill county, and hence it is often called the Schuylkill region.

The Mahanoy (often included in the Schuylkill) and Lehigh regions constitute the Middle coal field.

The Northern coal field is in Luzerne county, and embraces what is known as the Wyoming, Lackawanna, Scranton, and Wilkesbarre regions.

In addition to the production reported in our statistics it is estimated that some 3,000,000 tons are annually consumed in the coal regions by the engines, workmen, and local enterprises, the returns for which are not furnished.

The production of the three coal fields for a series of years has been as below :

Year.	Schuylkill.	Wyoming.	Lehigh.
1864.....	2,642,218	3,960,836	2,054,669
1865.....	3,735,802	3,256,638	1,822,525
1866.....	4,633,487	3,736,616	2,123,867
1867.....	4,334,820	5,329,312	2,062,446
1868.....	4,414,356	5,990,813	2,507,582
1869.....	4,748,960	6,068,365	1,929,583
1870.....	3,720,403	7,599,902	3,040,303
1871.....	5,124,780	6,481,171	2,249,356
1872.....	5,106,451	9,194,808	3,610,674
1873.....	5,209,156	10,047,241	3,243,163
1874.....	5,891,666	9,445,446	4,404,030

The details of the business for 1875 as also a comparison with that of the previous year is shown in the following schedule (all gross tons of 2240 pounds).

Route or Company.	Shipments to Interior Points.		Shipments to Competitive Points.		Total Shipments.	
	1875.	1874.	1875.	1874.	1875.	1874.
P. & R. R. Co.....	2,999,343	3,321,690	1,785,100	2,240,759	4,784,504	5,562,649
Delaware & Hudson.....	1,484,141	1,974,063	1,542,117	1,456,338	3,026,258	2,430,401
Lehigh Valley R. R.....	2,070,545	2,689,050	1,231,496	1,591,422	3,302,042	4,179,472
Central Railroad.....	1,383,648	1,584,228	1,277,986	1,388,058	2,661,635	2,972,286
D. L. & W. R. R.....	1,620,815	863,554	1,318,833	1,278,978	2,939,648	2,142,533
Penn'a. Coal Co.....	184,428	174,545	1,183,749	1,165,118	1,368,207	1,338,663

The range in prices during the year is shown below. We give the rates of the New York Company coals for each month, in which changes were made in the price list.

	Lump.	Steamer.	Broken.	Egg.	Stove.	Chestnut.
March.....	\$4 40	\$4 50	\$4 60	\$4 75	\$5 30	\$4 35
April.....	4 60	4 70	4 80	4 95	5 40	4 40
May.....	4 80	4 90	5 00	5 15	5 60	4 60
June.....	4 90	5 00	5 10	5 25	5 70	4 70
July.....	5 00	5 10	5 20	5 35	5 80	4 80
August.....	5 00	5 10	5 20	5 45	5 90	4 90
September.....	5 05	5 15	5 25	5 55	6 00	4 95
October.....	5 05	5 15	5 25	5 65	6 10	4 95

The rates for coals of the Philadelphia and Reading Coal and Iron Co., were based upon fifty cents per ton less than the above, f. o. b. at Philadelphia. The price lists for January and February were nominally those of December 1874—for N. Y. Co.'s Lump \$5.55; Steamer \$5.65; Broken \$5.75; Egg \$5.90; Stove \$6.40; Chestnut \$5.35. For November and December 1875, rates were nominally as per October price list.

The rate of transportation charged by Reading Railroad Company on the individual coal carried during the early part of the year 1875, was \$1.67 per ton, advancing to \$1.92 before the close, subject to drawbacks on coal sold on contract; the rate from Mauch Chunk by rail to the tide-water shipping ports was \$2.41 per ton in the early part of the year, and \$2.10 at the close; as the suspension was general for the first half of the year, the latter rate may be said to be the expense on coal, free of shipping charges.

Coastwise freights during the year were low from all points, and this enabled considerably more tonnage to be moved, than would otherwise have been the case.

As showing the value of Anthracite for metallurgical purposes, we append the following results of analyses made for that purpose by J. B. Britton, Esq., of Philadelphia.

	Wyoming.	Schuylkill.	Lehigh
Moisture.....	1.38	1.35	1.30
Vol. Combustible Matter.....	3.52	3.78	3.05
Ash.....	3.24	5.81	3.54
Fixed Carbon.....	91.86	89.06	92.11
	100.00	100.00	100.00

### ANTHRACITE COAL TONNAGES.

THE LEHIGH COAL AND NAVIGATION COMPANY began the mining and shipment of coal in 1820 with 365 tons; in 1874 the mining portion of the Company's business was merged into the Lehigh and Wilkesbarre Coal Co.—Statistics showing the progress of business are as follows:

Years.	Tons.	Years.	Tons.	Years.	Tons.
1820.....	365	1845.....	257,740	1870.....	468,272
1825.....	28,393	1850.....	424,268	1871.....	762,682
1830.....	43,000	1855.....	449,812	1872.....	1,014,890
1835.....	131,250	1860.....	517,157	1873.....	1,081,153
1840.....	102,264	1865.....	517,025	.....	.....



THE MORRIS CANAL began carrying coal in the year 1845. Statistics showing the progress of business are as below :

Years.	Tons.	Years.	Tons.
1845.....	12,567	1870.....	309,843
1850.....	98,100	1871.....	315,610
1855.....	290,730	1872.....	341,983
1860.....	404,464	1873.....	301,214
1865.....	416,139	1874.....	267,605

THE DELAWARE AND HUDSON CANAL COMPANY began the mining and carrying of coal in the year 1829; the progress of their business is shown below :

Years.	Tons.	Years.	Tons.
1829.....	7,010	1871.....	1,366,471
1830 to 1839.....	846,330	1872.....	2,930,767
1840 to 1849.....	2,897,931	1873.....	2,752,595
1850 to 1859.....	4,833,855	1874.....	2,399,417
1860 to 1869.....	10,093,691	1875.....	3,056,479
1870.....	2,039,722		

THE PHILADELPHIA AND READING RAILROAD COMPANY began the carrying of coal in the year 1850; business has been increased as below :

Years.	Tons.	Years.	Tons.
1850.....	1,351,502	1871.....	6,002,573
1855.....	2,213,292	1872.....	6,185,434
1860.....	1,946,195	1873.....	6,546,553
1865.....	3,090,814	1874.....	6,343,812
1870.....	4,633,504	1875.....	5,505,454

THE DELAWARE, LACKAWANNA AND WESTERN RAILROAD began in the year 1854, the business has been as below :

Years.	Tons.	Years.	Tons.
1854—59.....	2,629,364	1872.....	2,536,943
1860—69.....	13,343,126	1873.....	3,136,306
1870.....	2,343,097	1874.....	2,570,437
1871.....	1,916,486	1875.....	3,626,901

THE PENNSYLVANIA COAL Co., commenced business in the year 1850; their product has been as follows :

Years.	Tons.	Years.	Tons.
1850—59.....	4,834,723	1872.....	1,213,478
1860—69.....	7,249,820	1873.....	1,239,214
1870.....	1,036,008	1874.....	1,338,663
1871.....	802,039	1875.....	1,353,207

THE LEHIGH VALLEY RAILROAD COMPANY began the carrying of coal in the year 1855; the progress of their business is shown below;

Years.	Tons.	Years.	Tons.
1855.....	8,432	1872.....	3,850,118
1860.....	730,641	1873.....	4,144,339
1865.....	1,637,463	1874.....	4,150,629
1870.....	3,603,586	1875.....	3,277,571
1871.....	2,859,074		

THE BELVIDERE Division of Pennsylvania Railroad was opened for traffic in the year 1857; the business has progressed as follows:

Years.	Tons.	Years.	Tons.
1857.....	123,248	1871.....	632,427
1860.....	146,308	1872.....	965,553
1865.....	214,345	1873.....	1,155,332
1870.....	714,217	1874.....	1,227,903
1875.....		1875.....	1,227,419

THE WILKESBARRE COAL AND IRON Co., began mining in 1869; merged into LEHIGH AND WILKESBARRE COAL Co., in 1874. The business is shown below:

Years.	Tons.	Years.	Tons.
1869.....	512,485	1873.....	1,178,307
1870.....	799,226	1874.....	2,479,382
1871.....	950,754	1875.....	2,085,088
1872.....	1,168,716		

## THE PROGRAMME FOR 1876.

We are enabled to lay before our readers a statement of the prices of coal and basis of operations for 1876, as fixed upon by the combined Anthracite coal producing companies. A meeting of the parties in interest held during February, organized as the Board of Control, electing Mr. Thomas Dickson, President of the Delaware and Hudson Canal Co., as President, and Franklin B. Gowen, of the Philadelphia and Reading Railroad, and Philadelphia and Reading Coal and Iron Co., as Secretary. The rules adopted by the Board of Control are as below:

We, the undersigned committee, submit the following plan for the government of the anthracite coal trade to competitive points for the year 1876, viz:

I. Competitive tonnage shall embrace all coal which, for final consumption or *in transitu*, reaches any point upon the Hudson river or the Bay of New York, or which passes out of the Capes of the Delaware, including all sizes except pea coal: provided that nothing shall be accounted as pea coal which will not pass through a screen-mesh of three-quarters of an inch square.

II. For the purpose of making a pro rata distribution, the competitive tonnage for the year 1876—i. e., from January 1 to December 31—shall be assumed to be eight millions five hundred thousand tons, which amount shall be divided among the several parties hereto as follows:

	Per cent.	Tons.
Reading Railroad.....	25.57	2,173,450
Delaware and Hudson Canal.....	13.18	1,545,300
Central Railroad of New Jersey.....	15.93	1,358,300
Lehigh Valley Railroad.....	15.80	1,343,000
Delaware, Lackawana and Western.....	13.65	1,160,250
Pennsylvania Coal Company.....	10.82	919,700

8,500,000

III. That the aggregate tonnage awarded to each interest, as above, shall, prior to February 20, be divided into monthly shipments for the entire season, including in such division the actual shipments for the period of the year already elapsed, and when such division is made and approved by the Board of Control it shall represent the monthly quota of each interest for each month respectively. If during any month the aggregate shipments to competitive points exceed or are less than the aggregate of all the monthly quotas for such month, the excess or deficiency, as the case may be, shall be distributed to or be borne by the several interests in the proportion of their respective yearly quotas, the object being that any excess or diminution of tonnage over or under the assumed amount of eight million five hundred thousand tons shall be divided according to the yearly quotas, and not according to the monthly quotas of the months in which such excess or diminution occurs, so that at the end of the year the entire competitive tonnage shall be divided amongst all the interests in the exact proportion of their respective yearly quotas.

IV. That on or before the tenth day of each month each interest shall make a return to the secretary of the Board of Control of the entire coal production and shipments of its region or district, giving the origin of all coal tonnage, with such detail of the destination and distribution thereof into local and competitive, as may be required by the secretary, in order to enable him to examine into and vouch the correctness of the several items; and in addition thereto, the shipping books and tonnage accounts of each company shall at all times be open to the inspection and examination of any member of the association or of his authorized agent.

V. That at the meeting of the Board of Control held next preceding the twentieth of each month the secretary shall make return showing the actual shipments of each interest for the preceding month, together with the excess or deficiency of each, calculated as hereinabove provided; and thereupon each interest which is in excess of its proper shipment shall pay to the secretary and treasurer the sum of one dollar and fifty cents for each ton of such excess, for distribution by the said secretary and treasurer, at the rate of one dollar and fifty cents per ton, amongst those who have fallen short of the amount due to them in said month.

VI. That a committee of six, consisting of one representative from each interest, to be named by such interest, be appointed as a Board of Control for the year, who shall elect one of their members



as president and another as secretary and treasurer, and who shall meet at least once a month, and as much oftener as they may determine to be necessary, and who shall have power—

(a.) To establish from time to time the monthly prices at which coal shall be sold.

(b.) To provide for the increase or curtailment of the total quantity to be shipped to competitive points in any month, according to the requirements of the market.

(c.) To provide for the collection from time to time from all the members, in the proportion of their yearly quotas, any funds which may be necessary to pay the expenses incurred or authorized by the Board of Control.

(d.) To employ the services of an expert accountant, as an assistant to the secretary and treasurer, to keep the tonnage accounts of the several companies, and to receive, examine and report upon the tonnage returns received from each interest.

VII. That in establishing prices for coals the white ash coal of the different regions shall be the basis, and for such coals the price free on board in New York shall be thirty-five cents per ton above the free on board price in Philadelphia for all sizes except chestnut coal, which, at the option of the Philadelphia and Reading Coal and Iron Company, may be seventy cents per ton less in Philadelphia than in New York; Provided, that any interest may adopt higher prices for all or any of its coals than those established by the Board of Control; but Lehigh lump coal shall be fifty cents higher than other white ash lump coal.

VIII. That no commission shall be allowed on any sales of coal, and in lieu thereof, there shall be a contractors' circular price established for each month, for all such yearly contractors as shall, prior to April 1, make application, which shall be accepted for a fixed amount of coal to be taken during the year in regular monthly instalments, which price shall be twenty cents per ton less than the general circular rate at which transient orders are taken. The form of such contracts to be approved by the Board of Control.

IX. The contractors' prices for the month of March be as follows, free on board in New York:

Lump.....	\$4 20	Egg.....	\$4 70
Steamer.....	4 50	Stove.....	5 30
Grate.....	4 60	Chestnut.....	4 50

X. That season contracts with consumers only be made for lump, steamer, broken and chestnut coals, at the following rates, viz., free on board at New York:

	Lump.	Steamer.	Broken.	Chestnut.
March and April.....	\$4 20	\$4 30	\$4 40	\$4 30
May.....	4 25	4 35	4 45	4 35
June.....	4 30	4 40	4 50	4 40
July.....	4 35	4 45	4 55	4 45
August.....	4 40	4 50	4 60	4 50
September.....	4 45	4 55	4 65	4 52
October.....	4 50	4 60	4 70	4 60
November.....	4 55	4 65	4 75	4 65
December.....	4 60	4 70	4 80	4 70

and at thirty-five cents per ton less free on board in Philadelphia, except for chestnut coal, which may be seventy cents per ton less than the free on board price in New York. It being provided that all such contracts shall be made in writing prior to April 1, and that no commissions or allowances of any kind be made thereon, and that no such contracts be made with any other than a consumer of coal.

XI. That all sales to be made for cash, or with seven per cent. interest added in all cases for any deferred payment, the interest to commence from the date of the bill of lading, and all deliveries of coal be charged at the circular prices current in the month when the delivery is made, and under no circumstances shall any coal shipped in one month be charged at the circular prices of a preceding month, unless the purchaser had a vessel at the shipping point ready to receive the coal before the expiration of the previous month, and was actually entitled to receive the coal during such previous month.

XII. That no coal shall be sold by any party in any other manner than is above provided, or at any less prices, either directly or indirectly, than those above named, or which may from time to time be established as the monthly circular rates by the Board of Control.

XIII. That nothing but competitive tonnage shall be subject to the direction of the Board of Control, and that each interest shall have the absolute and exclusive control of its local trade.

XIV. That each transporting company shall be held responsible for the faithful adherence to these regulations on the part of all individual shippers using its lines to carry coal to competitive points.

Respectfully submitted,

THOMAS DICKSON, } Committee.  
FRANKLIN B. GOWEN. }

New York, February 15, 1873.

## THE BITUMINOUS COAL DISTRICTS.

## PENNSYLVANIA.

## BLOSSBURG REGION.

The first coal from this region was sent to market from the Bloss mines in 1840. The producers of this region are the Fall Brook Coal Company, Morris Run Coal Company, and Blossburg Coal Company, with mines near Blossburg, Tioga county, Pa.

Seventy-five miles of railway, carries the coal from the Blossburg region to Seneca lake, in New York State, where it is received into canal boats which deliver it throughout the State. The railway from the mines connects with the Erie Railway at Corning. N. Y., affording additional outlet for the coal from this region.

The most important seam is that known as the Bloss vein, a clean bed of pure coal, from  $4\frac{1}{2}$  to  $5\frac{1}{2}$  feet in thickness.

Statistics of the output are shown in the following schedule.

Year.	Tons.	Year.	Tons.
1840.....	4,235	1871.....	815,079
1850.....	23,161	1872.....	849,262
1860.....	78,918	1873.....	991,057
1865.....	394,642	1874.....	796,388
1870.....	733,035	1875.....	581,782

## BARCLAY REGION.

This region is located in Bradford county, Pa., some 36 miles south from Waverly, N. Y. The mines are owned by the Fall Creek Bituminous Coal Co., and the Erie Railway Co., (comprising the lands formerly of the Barclay, the Towanda Coal Co. and the Schrader Coal Co.'s).

The following table shows the amount of coal shipped from the Barclay, Coal Region, by the several companies which have operated it:

Year	Barclay Coal Co.	Towanda Coal Co.	Fall Creek Coal Co.	Total Products.
1856.....	2,295	.....	.....	2,295
1857.....	6,265	.....	.....	6,265
1858.....	17,560	.....	.....	17,560
1859.....	30,143	.....	.....	30,143
1860.....	27,718	.....	.....	27,718
1861.....	40,835	.....	.....	40,835
1862.....	52,779	.....	.....	52,779
1863.....	54,535	.....	.....	54,535
1864.....	62,058	.....	.....	62,058
1865.....	48,375	7,886	16,936	73,197
1866.....	37,968	31,881	29,604	99,453
1867.....	30,119	27,668	16,953	74,739
1868.....	.....	67,080	6,595	73,675
1869.....	.....	176,307	4,303	180,610
1870.....	.....	196,310	77,025	273,335
1871.....	Schrader	249,240	129,095	378,335
1872.....	Coal Co.	263,960	118,882	382,842
1873.....	.....	252,329	85,315	337,644
1874.....	100,219	215,572	21,281	337,072
1875.....	167,686	200,424	18,507	376,637

## MCINTYRE REGION.

The McIntyre Coal Co., whose mines are at Ralston, Pa., on the North-Central Railway (54 miles from Elmira, N. Y.), which gives them an outlet both north and south to a market, commenced operations in 1870.

Statistics of their business are as below :

Year	Tons.	Year	Tons.
1870.....	17,802	1873.....	212,462
1871.....	106,138	1874.....	138,907
1872.....	111,420	1875.....	164,507

Since the opening of the mines of the Blossburg district in 1840 the shipments by each company have been as follows :

Arbon Coal Company 1840—1843.....	49,633	net tons.
Wm. M. Mallory, 1844—1857.....	405,112	"
D. S. Magee, 1856—1859.....	78,996	"
Tioga Transportation Company.....	323,174	"
Salt Company of Onondaga, 1863—1866.....	267,809	"
Morris Run Coal Company, 1864—1875.....	3,340,687	"
	3,931,670	"
Fall Brook Coal Company, 1860—1875.....	2,946,753	"
Blossburg Coal Company, 1866—1875.....	1,604,344	"
Total production of the District.....	9,066,517	"

## BROAD TOP REGION.

The area of this coal field is stated at 80 square miles, and the aggregate thickness of workable coal seams is 26 feet, the larger seams range from five to ten feet in thickness, and the lesser from one to three.

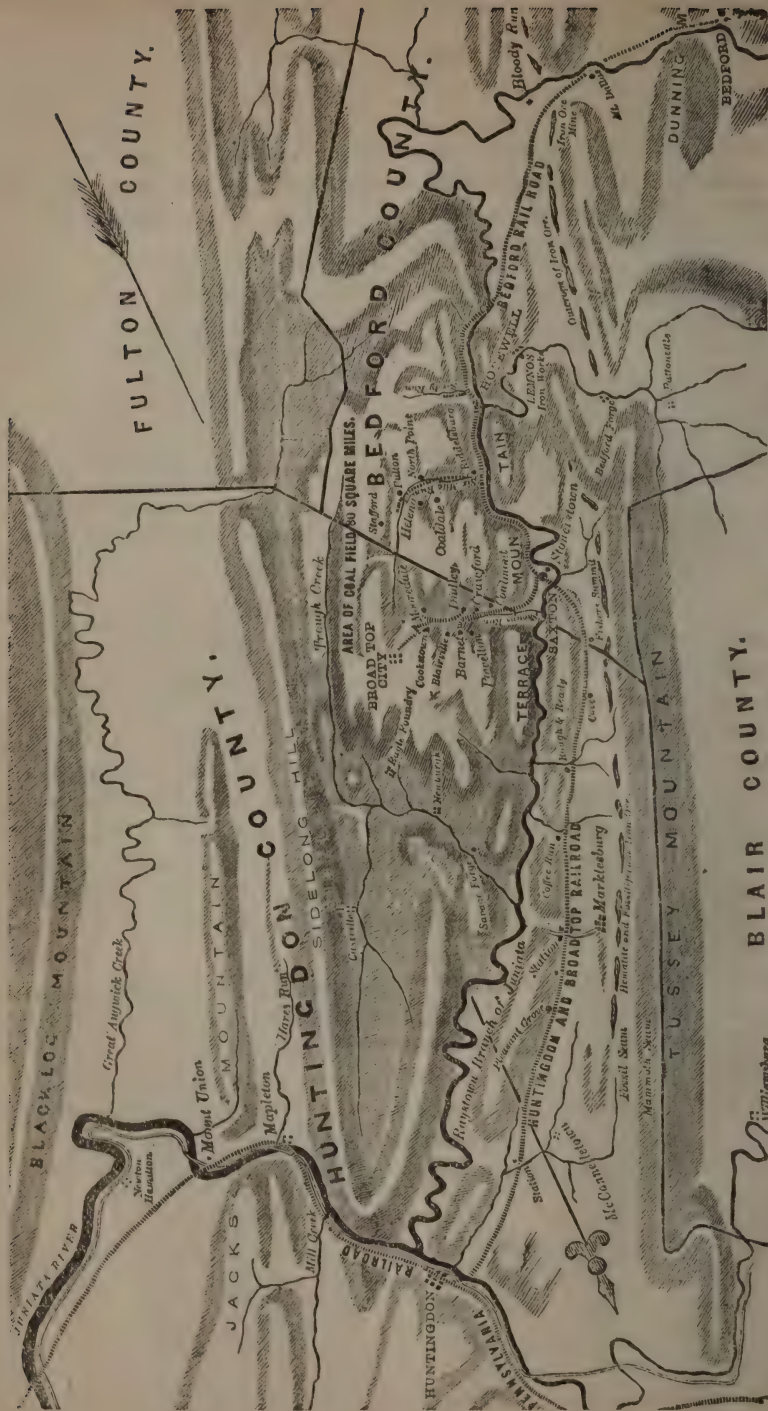
An outlet for the coal from this region is afforded by the Huntingdon and Broad Top Mountain Railroad (this was completed in 1856, and during the latter part of that year, 42,000 tons were forwarded from this region to various markets). This line extends from the town of Huntingdon, on the Pennsylvania Railroad, 203 miles west of Philadelphia, to Mt. Dallas in Bedford county, a distance of 45 miles. At Saxton, 24 miles from Huntingdon, a branch road, 10 miles in length, extends to Broad Top City; at Riddlesburg, 5 miles beyond Saxton, is another branch in to Fulton, 5 miles from the main road.

From Mt. Dallas the Bedford and Bridgeport Railroad, 38 6-10 miles in length, extends to the Maryland State line; from this point to Cumberland, Md., via the C. and P. R. R., is 7 miles. This connection gives an outlet to the George's Creek Cumberland coal to the interior markets of Pennsylvania, to Philadelphia and South Amboy, N. J. The Bedford and Bridgeport road is leased to the Pennsylvania Railroad and operated by them.

The yearly shipments from this region, by the H. & B. T. R. R., have been as follows :

Year	Tons.	Year	Tons.
1856.....	42,000	1866.....	265,720
1857.....	78,813	1867.....	244,412
1858.....	105,478	1868.....	280,936
1859.....	130,595	1869.....	360,778
1860.....	186,903	1870.....	313,425
1861.....	272,625	871.....	319,625
1862.....	333,606	1872.....	297,473
1863.....	305,678	1873.....	350,245
1864.....	386,645	1874.....	226,693
1865.....	315,902	1875.....	204,291





MAP OF THE BROAD TOP COAL AND IRON REGION.

The East Broad Top Railroad, penetrated this coal field during 1875, and carried 53,567 tons of coal in that year.

The shipments of Cumberland coal over the Pennsylvania State line, and H. & B. T. R. R., have been as below :

1872.....	22,021	tons.	1874.....	67,671	tons.
1873.....	114,589	"	1875.....	175,154	"

In regard to the prices obtained for this coal, we are informed that the following are the average rates, f. o. b. at Philadelphia :

Years	Price.	Years	Price.
1863.....	\$5.75	1869.....	\$4.75
1864.....	6.50	1870.....	4.50
1865.....	7.25	1871.....	4.60
1866.....	5.75	1872.....	4.70
1867.....	4.75	1873.....	5.00
1868.....	4.50	1874.....	4.55
1875.....			\$4.15

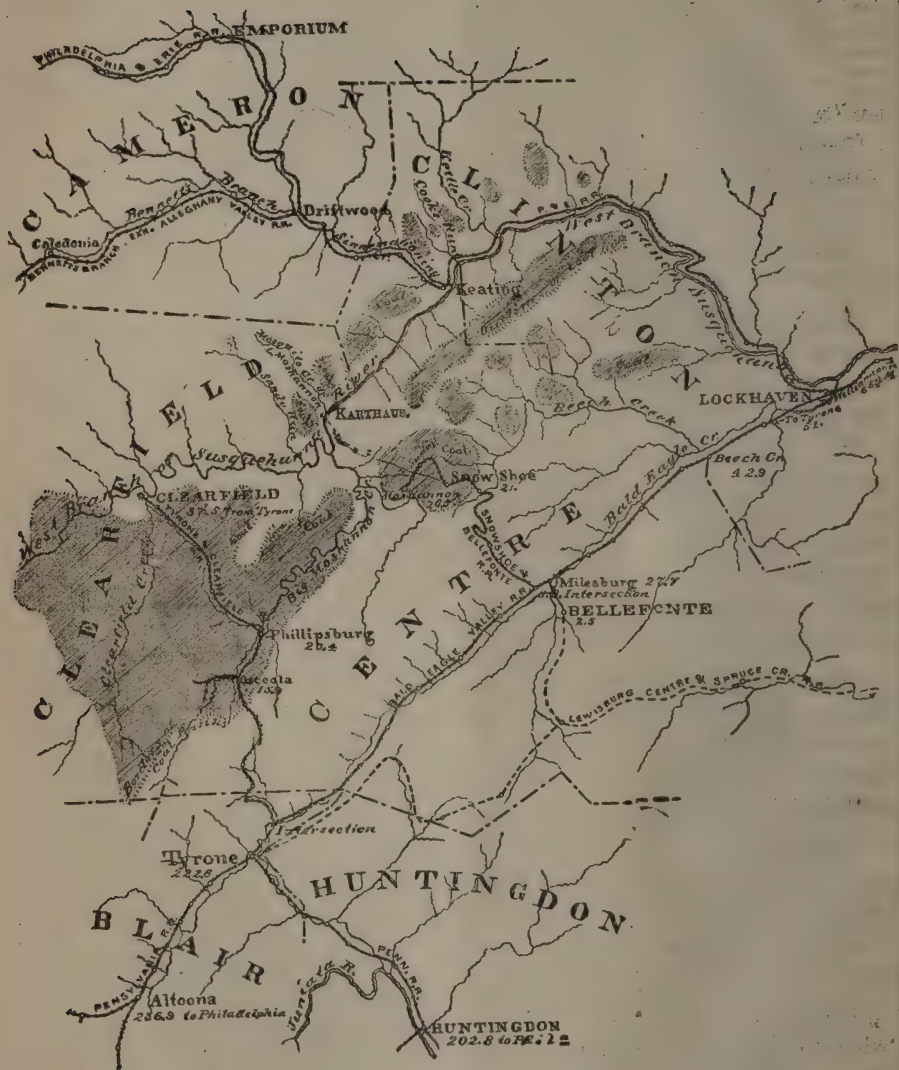
The details of the business for 1875, and names of operators are as below :

<i>Colliery.</i>	<i>Operator.</i>	<i>Tons sent to market in 1875.</i>
Cumberland,	R. Langdon & Co.,	14,672
Crawford,	do.	
Powelton,	R. H. Powel & Co.,	23,926 $\frac{1}{4}$
Barnet,	R. U. Jacob & Co.,	8,421 $\frac{1}{2}$
Dudley,	J. M. Bacon,	2,640 $\frac{1}{2}$
Blair,	do.	2,395 $\frac{3}{4}$
Howe,	do.	8,989
Mooredale.	Reakirt Bros. & Co.,	20,904
Fisher,	Fishers & Miller,	15,292 $\frac{1}{2}$
Carbon,	Geo. Mears,	20,351
Mount Equity,	Kemble C. & I. Co.,	41,738 $\frac{1}{4}$
Cunard,	R. B. Wigton,	19,717
Scott,	William Scott,	212 $\frac{1}{4}$
Helena,	E. P. Jenkins,	539 $\frac{3}{4}$
Coaldale,	Wm. H. Piper,	24,737 $\frac{1}{2}$
Rommell,	Maher & Wilson,	383 $\frac{1}{4}$
Total for 1875.	- - - - -	204,920 $\frac{3}{4}$

#### SNOW SHOE REGION.

This region is located in Centre county, Pennsylvania, covers an area of about eight miles in length, and some four miles in breadth, and is situated on both sides of Beach Creek. The coal finds an outlet to market, via the Bellefonte and Snowshoe and Bald Eagle Valley connections of the Pennsylvania Railroad, it being 47 miles from Snowshoe to Tyrone on the main line.

There is but one company mining in this district. It commenced opera-



MAP OF THE CLEARFIELD. REGION



tions in the year 1862, with 8,260 tons, and has increased as below :

Years	Tons.	Years	Tons
1862.....	8,260	1869.....	89,356
1863.....	12,039	1870.....	85,276
1864.....	33,593	1871.....	79,984
1865.....	51,881	1872.....	68,988
1866.....	70,890	1873.....	95,257
1867.....	58,137	1874.....	63,540
1868.....	60,149	1875.....	62,426

Prof. Rogers gives this Snowshoe coal 78.8 of Fixed Carbon, and 21.2 of Volatile Matter and Ashes.

#### CLEARFIELD REGION.

The district known as the "Clearfield," is located in Clearfield and Centre counties, in the State of Pennsylvania.

It has within a few years become a most important producer of Semi-Bituminous coal, and has made a market in the interior cities and towns of Pennsylvania and New Jersey, at Philadelphia, Baltimore, New York and the Eastern States.

The coal measures are found to be admirably adapted for working, dipping gently toward the Moshannon Creek, which flows through the centre of the basin. The lowest seam of coal (A), five feet thick, crops out on the level of this stream. The next (B), sixty feet above, is three to four feet in thickness. Fifty feet above is another seam (C), ranging from two to three and a half feet in thickness. Again, fifty feet above, is found a seam (D) of five feet of good solid coal.

The coal is used for steam purposes under stationary, marine, or locomotive engines, for making iron and steel rails, for glass works, in lime kilns, and for many other purposes, being much liked wherever used ; ignites freely, burns readily, and leaves a white ash. It is not easily friable, and bears transportation remarkably well.

The outlet for the coal from this region is by connections with the Tyrone and Clearfield Branch of the Pennsylvania Railroad, extending from Tyrone on the main line, (224 miles west from Philadelphia), to Clearfield, 41 miles. Another, via Karthaus and Keating is projected which will shorten the distance to Philadelphia, and the grades will be more favorable.

The Pennsylvania Railroad Company own the railroads, the shipping wharves, and all the means of access to the markets of the Atlantic seaboard ; the advantage of being connected with a railroad of such magnitude, and wonderful ramifications and communications, gives the coal proprietors of this region great facilities for the proper conduct of their business.

Mining operations began in this region in 1862 ; from that date to 1870 we are informed that there has been forwarded 696,377 tons.

Years	Tons.	Years	Tons.
In 1870.....	410,523	In 1873.....	592,860
In 1871.....	542,896	In 1874.....	639,630
In 1872.....	431,915	In 1875.....	915,573

Analyses of coal from this district made by the State Geological Survey of 1875, gave :

NAME OF COLLIERY	Water.	Volatile matter.	Fixed carbon.	Sulphur.	Ash.
<i>Clearfield County.</i>					
1. Penn Colliery.....	.870	20.640	74.023	.507	4.020
2. Franklin Colliery.....	.670	21.360	74.284	.435	3.251
3. Eureka Mine.....	.780	21.680	73.052	.688	3.800
4. Stirling Mine.....	.710	23.400	72.218	.532	3.140
5. Moshannon Colliery.....	.765	20.090	74.779	.666	3.700
6. New Moshannon Mine.....	1.100	23.070	71.199	.611	4.020
7. Hale's Colliery. Upper bed.....	.670	24.630	68.400	1.900	4.560
8. Hale's Colliery. Lower bed.....	.740	25.210	68.625	2.122	5.300
9. Mapleton Colliery.....	.700	23.565	68.890	1.715	5.130
10. Logan Colliery.....	.620	22.135	68.728	.867	7.650
11. Laurel Run Colliery.....	.800	23.260	72.350	.590	3.000
12. Decatur Coal Co.'s Colliery. Lower bench.....	.640	24.360	64.082	3.378	7.540
13. Decatur Coal Co.'s Colliery. Upper bench.....	.820	23.900	69.007	1.373	4.900
14. Morrisdale Mine. Lower bench.....	.550	24.090	71.689	.571	3.100
15. Morrisdale Mine. Upper bench.....	.560	25.190	71.013	.587	2.650
16. Derby Colliery.....	.410	22.810	66.690	1.790	8.300
17. Reitur's Colliery. Upper bed.....	.630	24.630	70.396	.654	3.690
18. Mon's Mine.....	.750	19.570	69.833	.677	9.170
19. Hill's Mine.....	.380	22.280	67.995	2.455	6.890
20. Humphrey's Mine.....	.410	21.800	72.903	1.087	3.800
21. Mason's Mine. Upper bench.....	.550	22.650	72.616	1.334	2.850
22. Mason's Mine. Lower bench.....	.480	22.320	59.788	4.232	13.180
23. G. W. Davis' Mine.....	.640	23.010	71.799	.551	4.000
24. Jeremiah Cooper's Mine.....	.700	24.020	64.951	1.639	8.690
25. Williamson's Mine.....	.620	22.730	68.784	1.376	6.280
26. Powelton Mine. Lower part of bed.....	.600	22.600	68.769	2.691	5.400
27. Powelton Mine. Upper part of bed.....	.540	22.560	71.551	1.079	4.270
28. Webster's Colliery.....	1.630	22.000	72.315	.425	3.130
29. Bell's Mine.....	.950	32.450	59.904	1.296	5.400
30. Tyler's Mine.....	.940	31.060	61.563	1.487	4.950
31. R. Shaw's Mine.....	.870	21.680	68.928	1.302	7.220
32. J. Shaw's Mine.....	.520	21.030	67.133	.767	10.550
33. Mongold's Mine.....	.860	31.600	61.662	2.223	3.590
34. Hubler's Mine.....	.420	25.010	67.221	2.479	4.870
35. Beaver Run.....	.920	21.550	74.009	.631	2.890
<i>Centre County.</i>					
1. Snow Shoe Mines. Upper bed. Mine No. 5.....	1.250	25.580	68.937	.613	3.590
2. Snow Shoe Mines. Middle bed. Mine No. 6.....	.650	24.500	70.116	.964	3.410
3. Snow Shoe Mines. Lower bed (B). Mine No. 4.....	.750	23.440	64.374	.986	10.450
4. Wm. Holt's Mine, west of Holt's Hill.....	.880	23.628	70.089	.661	4.760
5. Wm. Holt's Mine, Snow Shoe basin. Upper b'h.....	1.680	21.870	71.108	.612	4.730

#### SONMAN.

This district lies in Cambria county, the coal worked is the same vein that is mined in Clearfield county ; the coal here has a heavier cover than where found in the adjoining county of Clearfield, is strong, and partakes somewhat of the nature of the gas coal found in Westmoreland county, which adjoins it on the south west ; the trade has largely increased during the two years past, shipments having been made to all tide water ports, to New England, Baltimore, Chicago, Cleveland, etc., at the west, and along the line of the Pennsylvania Railroad, it has not only maintained its place, but gained in favor.

Analysis made of the Sonman coal from this district gave the following results as compared with Broad Top and Westmoreland.

	I.	II.	Broad Top.	West- moreland.
Volatile matter.....	18.30	17.70	17.85	32.95
Fixed Carbon.....	78.60	78.30	74.65	61.45
Ash.....	2.70	2.70	7.50	5.50
Sulphur.....	0.40	0.40	1.85	1.04

No. I. was made by Dr. Charles M. Cresson, and II. by Messrs. Booth & Garrett; the yield of coke showed 82.30 per cent.; taking Pennsylvania coal as the standard for steam, the Sonman is equivalent to .959.

#### MONONGAHELA REGION.

This district may truly be called the perfection of a coal region. The Monongahela river for 95 miles, possesses every advantage for facilitating the production of coal, and it is not surprising that the tonnage is so immense. The seam worked is of uniform thickness, and yields a pure coal, used for iron making, steam raising, and for gas and domestic purposes.

By means of its slack-water navigation, the Monongahela river is made navigable at all seasons of the year, and boats carrying 800 tons are passed down. The city of Pittsburgh is supplied mainly by railroad, and the larger portion of the coal going down by the river, is run down the Ohio and Mississippi to the lower markets. The boats in use are known as "broad horns" carrying 20,000 bushels, "barges" carrying 11,000 bushels, and "flats" carrying 2,000 bushels. The following statement of shipments by the slack-water navigation, from 1845 to date, is of interest:

Year	Tons.	Year	Tons.
1845.....	184,200	1860.....	1,517,909
1846.....	311,156	1861.....	834,630
1847.....	385,805	1862.....	743,358
1848.....	392,774	1863.....	1,134,150
1849.....	398,340	1864.....	1,402,828
1850.....	491,918	1865.....	1,580,791
1851.....	490,850	1866.....	1,704,212
1852.....	585,233	1867.....	1,202,908
1853.....	628,654	1868.....	1,812,040
1854.....	693,273	1869.....	2,100,504
1855.....	889,360	1870.....	2,303,856
1856.....	353,364	1871.....	1,944,852
1857.....	1,158,939	1872.....	2,291,220
1858.....	1,027,866	1873.....	2,094,312
1859.....	1,131,467	1874.....	2,533,504
		1875.....	2,275,265

#### WESTMORELAND GAS COAL.

This well known coal is mined near Penn and Irwin stations, on the Pennsylvania Railroad, in Westmoreland county; the distance from Philadelphia is 332 miles. The coal mined is the great Pittsburgh bed of bituminous coal; the companies operating in this region are large and influential, doing a business of about a million tons annually; the coal is used in every seaboard city for gas purposes, and commands a high price. The shipping points are South Amboy, N. J., and Greenwich on the Delaware river. The product for 1874 was 952,971 tons, and for 1875, 769,968 tons,



(including 36,273 tons coke), the decrease was owing to a long and vexatious strike in the early part of the year.

This coal is in great favor among gas engineers in the United States.

In the dry way, by the ordinary process, the Westmoreland coal yields on an average sample as follows :

Charge, 224 pounds, carbonized 3 h. 20 m., produced per ton.....	9,500 cu. ft.
Illuminating power, standard Argand.....	16,62 candles.
Weight of coke, per ton.....	1,544 pounds.
Bushels of coke, per ton.....	40
Maximum yield of gas per ton.....	10,642 cu. ft.
One bushel of lime purified.....	6,420 cu. ft.

#### Analysis of the coal :

Volatile matter.....	36 per cent.
Fixed carbon.....	58 “
Ash.....	6 “
	100

Value of the gas from one ton estimated in pounds of spermacetti .....541.26 pounds

The above results were obtained in the experimental works of the Manhattan Gas Light Company, New York, where the daily average yield of gas from this coal and its equivalent, the “Penn,” is about 10,000 cubic feet of seventeen candle gas.

#### MERCER COUNTY, PENNSYLVANIA.

The most important coal region in North-west Pennsylvania (running over into Eastern Ohio), is that of Mercer county. The coal produced is what is known as the splint or block coal, and is used in the raw state for smelting iron ; the principal location of this peculiar coal is on the Erie and Pittsburgh Railroad, about 75 miles south from Erie, and finds an outlet to market by this route and the Beaver and Erie canal. The beds vary from two to five feet in thickness, and some half million tons are annually produced, the figures for 1873 aggregating 529,496 net tons.

#### WEST BRANCH REGION.

The Philadelphia and Erie Railroad runs across the northern ends of five coal basins. There is no important development of the first two. In the third, at 67 miles west of Williamsport, is the Wistar Mountain Co.'s mines ; at 97 miles, are the works of the Cameron Coal Co. In the fourth, at 117 miles, is St. Mary's ; at 125 miles, Benzinger's ; at 128 miles, the Shawmut branch road comes in. In the fifth, at 138 miles, are the Johnsonburg mines. The completion of the Philadelphia, New York and Buffalo Railroad gives the coal from these basins an outlet to an additional market ; 81,742 net tons were shipped in 1873, and 162,000 tons in 1874.

#### McKEAN COUNTY, PENNSYLVANIA.

The body of coal in the fifth basin, in the southern part of McKean county, is so large and important, and is situated so near the Buffalo and Rochester markets, that the district is entitled to more than ordinary

notice. In Sargeant township, at Bishop's Summit, on the head-waters of the Instanter, running into the Clarion on the South, and on Red Mill brook, running into Potato creek and the Allegheny river on the north-east, is a large solid body of several thousand acres of unbroken coal measures. No other coal basin contains so large a body of coal at its northern extremity as this, owing probably to its being situated on the dividing waters where the work of denudation has been less destructive. An excellent railroad route renders the region accessible by a branch from the Buffalo, New York and Philadelphia Railroad at Larrabee's up the valley of Potato creek, past Smethport, and by Red Mill brook to Bishop's Summit, the distance being but 108 miles to Buffalo, and 150 to Rochester.

Analyses and practical tests of considerable quantities of this coal, under stationary and locomotive boilers, indicate that it is a good quality of bituminous coal for gas, with excellent steam-generating qualities. No other county in Northern Pennsylvania, not even Tioga, contains so much coal as McKean. A large company, composed of Buffalo capitalists and others, called "The Buffalo Coal Company," has been organized for the development of this region, and are now vigorously engaged in mining and shipping. During 1875, while at work only six months, the business was 131,190 tons. We give the following analyses of three samples, from the State survey report for 1875.

Water.....	1.130	1.390	1.170
Volatile matter..	33.090	39.830	35.440
Fixed carbon.....	53.006	52.063	43.992
Sulphur.....	1.874	1.727	1.708
Ash.....	10.900	5.080	17.690

## SOMERSET COUNTY, PENN'A.

In Somerset county, Pennsylvania, and adjoining the Cumberland region of Maryland is the coal field known as the Myer's mills or Salisbury region, said to be an extension of the Cumberland coal basin. The coal is of the same quality and will yield an equal quantity per acre. It is eleven miles from Frostburg, Md., (on the line of the Pittsburgh, Washington and Baltimore Railroad.) and the coal finds an outlet to Baltimore, etc., over this line and the main stem of the B. & O. R. R. The Keystone Coal Co. have been at work here since 1872, and have already built up an established business ranging from 250 to 600 tons per day according to the season: the property of the company is advantageously situated for the shipment of its production, and the rate of transportation from the mines to market is very favorable. The Cumberland and Elk Lick Coal Co. own 1,500 acres of land in this disirict, and have been doing a small business, putting the mines in order for a larger trade in the near future.

Myers mills, which may be stated as the centre of the district, is 217 miles from Baltimore, and 112 miles from Pittsburgh, by present routes

The first coal seam rests on a thin floor of fire clay. The coal bed has two benches ; the lower, 18 inches thick, is an impure cannel coal circling to block structure ; the upper is a medium quality of semi-bituminous coal with the well marked columnar structure peculiar to Allegheny coals.

The interval between this and the next small coal seam is composed of thin plates of sandstones with olive-colored shales.

The second workable seam (B) is pre-eminently *the bed* of the lower system of coal measures ; not, perhaps, so much from its size and good quality of coal, as from its ready and sure identification, wherever it exists, by the massive bed of limestone on which it rests. The farmers trace it from hillside to hillside, regarding it with peculiar affection as a *double gift*—not only supplying fuel for domestic use, but also with lime to enrich the “glades” in their mountain farms.

The coal in this bed is columnar in structure with plates of mineral charcoal disseminated. In structure and quality it is closely associated with the best Clearfield coal. It will be found a superior fuel for iron working.

The third seam (C) is all pure coal of an excellent quality ; but as the bed is high in the measures and does not occupy a wide area in this portion of the field, it has as yet received little attention.

From seam (B) to the top of the scale the measures are composed of very soft flesh and olive colored shales, which have been rounded and softened into easy rolling slopes and rounded hills.

## WEST VIRGINIA GAS COAL REGION

The class of gas coal known in the New York and Eastern markets as “West Virginia gas coal,” is mined in Marion, Taylor, Ritchie and Preston counties, in that State, the mines being located near to the main line of the Baltimore and Ohio Railway. The coal is used for gas in the cities of the seaboard, and is very favorably spoken of. The distances to Baltimore are as follows : From Clarksburg, 301 miles : from Fairmount, 302 miles ; from Newburg, 263 miles ; from Tunnelton, 260 miles ; from Cairo, 355 miles.

The veins are from six to eleven feet in thickness. Analyses of these coals have given the following results :

		Volatile matter.	Fixed carbon.	Ash.
Clarksburg, Main seam.....		56.74	41.66	1.60
“ Cannel.....		49.21	45.43	5.36

The trade to the seaboard began in the year 1868 with 165,772 tons. The business to date has been as below :

Year.	Tons.	Year.	Tons.	Year.	Tons.	Year.	Tons.
1868.....	165,772	1870.....	249,879	1872.....	217,569	1874.....	125,000
1869.....	269,158	1871.....	189,763	1873.....	190,673	1875.....	100,000



The only cause for a diminution of the product, lies in the fact, that of late years the B. & O. R. R. has not acted promptly in regard to freight charges at the opening of business, and the trade for Gas coal has been thrown into the hands of Pennsylvania coal producing companies.

In addition to the outlet eastward via B. & O. R. R., there is the Parkersburg route due west, crossing the Monongahela river at Clarksburg, and thence to the Ohio river at Parkersburg; and the Wheeling route north-westward, crossing the Monongahela at Fairmount, thence down the creek to the Ohio, and thence up the river to Wheeling. Both these branches enter the main coal measures near the crossing of the Monongahela above named, and traverse them to the Ohio. At Clarksburg and northward, down the valley of the Monongahela, is one of the richest coal regions of West Virginia. One of the beds in the neighborhood of this town measures from ten to twelve feet in thickness, with a thinner bed of more highly bituminous nature underlying; from some distance above Clarksburg, they may be followed with scarcely an interruption throughout the whole valley of the Monongahela northward to Pittsburgh.

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### THE CUMBERLAND, (MD.) REGION.

The Cumberland (George's Creek) coal field, located in Allegheny county, at the Western extremity of the State of Maryland, is the most important producer of Semi-Bituminous coal, of any district supplying the seaboard markets. The connections with the tide-water markets are via the B. & O. R. R., from the towns of Cumberland and Piedmont, 178 and 206 miles west from Baltimore; via the Chesapeake and Ohio Canal, following the Potomac river to Georgetown, 184 miles, and Alexandria, 191 miles from Cumberland.

The coal is bituminous, of superior quality; the vein worked is from seven to fourteen feet in thickness, but the full extent of the vein is seldom taken out, the roof being insecure. The mines are located at various distances from the shipping ports, say from  $1\frac{1}{2}$  to 20 miles from Piedmont, and from 11 to 33 from Cumberland.

The Consolidation Coal Company are the largest producers in the region, and own the Cumberland and Pennsylvania, and the Cumberland Branch lateral Railroads, but in point of shipments to tide-water they are far behind smaller companies; this company supplying the B. & O. Railroad.

In the year 1842 the Cumberland coal field sent its product to the tide-water markets over the branches of the B. & O. R. R., connecting with this field. In 1850 the Chesapeake and Ohio Canal was finished to Cumberland, Md.; and by it 4,042 tons were shipped in that year.





The production of Cumberland coal from 1842 to 1875, inclusive, was 28,681,454 tons, carried to market by the following routes, via B. & O. R. R., 18,850,671 tons; Chesapeake and Ohio Canal, 9,465,804 tons; and Pennsylvania State Line Railroad, 364,979 tons. The last named road was completed during the year 1872, connecting this region with the Pennsylvania Railroad, and 22,021 tons were carried over it in that year.

At the Piedmont end of this region, the Hampshire and Baltimore Company, and the Virginia Coal and Iron Company, connect by their own tram-roads with the B. & O. Railway.

The Superintendent of the United States Armory at Springfield, Mass., made very thorough tests of the steam raising quality of this coal in the year 1871, each variety of three different classes of coal was used for six consecutive days, with the following reported results :

	Lackawanna.	Pittston.	Cumberland.
Pound per h. p. per hour.....	4.01	4.02	3.63
Cost per gross ton.....	\$8.30	\$7.85	\$9.19
Cost per horse power.....	1 5-10 cts.	1 4-10 cts.	1 2-10 cts.

And it is therefore alleged that the bituminous coal is the more economical fuel as a steam generator, making more heat and creating more power than harder coals.

The total Cumberland coal trade by railroad and canal from the beginning is shown in the following schedule :

Years.	Total by B. & O. R. R.	Total by C. & O. Canal.	P. S. Line branch to the P. R. R.
1842.....	1,708	.....	.....
1843.....	19,482	.....	.....
1844.....	14,890	.....	.....
1845.....	24,653	.....	.....
1846.....	29,795	.....	.....
1847.....	52,440	.....	.....
1848.....	79,571	.....	.....
1849.....	142,349	.....	.....
1850.....	192,906	4,042	.....
1851.....	174,702	62,978	.....
1852.....	268,459	65,719	.....
1853.....	376,219	157,760	.....
1854.....	503,836	155,845	.....
1855.....	478,486	18,783	.....
1856.....	542,330	24,120	.....
1857.....	465,912	116,574	.....
1858.....	395,405	254,251	.....
1859.....	426,512	297,842	.....
1860.....	493,031	295,878	.....
1861.....	172,075	97,599	.....
1862.....	218,950	98,004	.....
1863.....	531,553	216,792	.....
1864.....	369,354	558,649	.....
1865.....	560,293	343,202	.....
1866.....	736,153	343,178	.....
1867.....	735,669	458,153	.....



Years.	Total by B. & O. R. R.	Total by C. O. Canal.	P. S. Line branch to the P. R. R.
1868.....	848,118	484,325	.....
1869.....	1,280,518	652,151	.....
1870.....	1,112,933	604,151	.....
1871.....	1,494,814	850,39	.....
1872.....	1,537,368	816,103	22,021
1873.....	1,78,710	773,802	114,583
1874.....	1,576,160	767,054	67,671
1875.....	1,302,237	879,338	160,693

The following is interesting as showing the average price of Cumberland coal at Baltimore, the freight thence to Boston, and the price at which it was delivered at Boston during a series of years past :

Year	Average for year.	Av. freight to Boston.	Av. cost delivered in Boston.
1861.....	\$3.44	\$2.25	\$5.69
1862.....	4.23	2.42	6.65
1863.....	5.57	3.23	8.83
1864.....	6.81	3.39	10.23
1865.....	7.57	3.79	11.36
1866.....	5.94	3.53	9.47
1867.....	4.97	2.68	7.65
1868.....	4.71	3.21	7.92
1869.....	4.97	2.93	7.89
1870.....	4.72	2.64	7.36
1871.....	4.72	2.73	7.45
1872.....	4.66	3.06	7.72
1873.....	4.81	3.17	8.01
1874.....	4.50	1.50	6.00
1875.....	4.20	1.30	5.50

During the year 1875, both coal and freights ruled very low, this enabled the district to hold up its product so nearly to that of former seasons ; there must necessarily have been a falling off, had not this been the case, as manufacturing was particularly dull during the year 1875.

The output during 1875 was produced by the following parties, and distributed by the routes named :

Names.	B. & O. R. R.	C. & O. Canal.	P. S. Line.	Local.	Total.
	Tons.	Tons.	Tons.	Tons.	Tons.
Consolidation.....	216,40	172,008	3,165	30,350	443,923
Maryland.....	63,203	196,106	.....	2,000	261,309
New Central.....	91,652	69,914	97,184	97	258,847
Borden Mining.....	14,351	182,497	32,461	3,149	234,453
American.....	57,033	122,774	313	.....	180,125
George's C. C. & I. Co.....	140,958	24,378	.....	1,021	166,357
Hamp. & Baltimore.....	9,029	53,690	.....	167	62,885
"    Va. Mines.....	90,699	.....	.....	110	90,800
Atlantic & George's Creek.....	118,199	230	24	3,463	122,916
Franklin.....	98,477	.....	.....	.....	98,477
George's Creek Mining.....	85,881	.....	.....	.....	85,881
Potomac.....	63,149	.....	.....	410	66,674
Swanton Mining Co.....	66,499	.....	27	143	63,559
Blaen Avon.....	3,041	57,241	.....	.....	60,282
Piedmont C. & I. Co.....	54,819	.....	524	.....	55,342
Virginia C. & I. Co.....	31,181	.....	.....	.....	31,181
North Branch.....	26,425	.....	.....	65	26,490
New Reading.....	19,399	.....	.....	.....	19,399
Davis Mines.....	5,866	.....	.....	.....	5,866
Total.....	1,261,257	879,532	16,693	40,930	2,342,773

Charges on the coal carried will be found in the "Rates of Transportation on Bituminous coals."

The entire length of this coal field is from 50 to 60 miles; viz., from the head waters of George's Creek, near Frostburg, about 15 miles to the north-east of Piedmont, to those of the north branch of the Potomac, some 30 miles to the south-east. The width of this valley averages 6 miles from outcrop to outcrop of the lower seams of coal. It is narrowest at the northern end, and widens out considerably at the southern. The total thickness of the coal containing strata is about 1400 feet, but this thickness does not pervade the entire area, as to the south of Piedmont and Bloomington the erosion has been greater, and it is only a few isolated hills that contain the upper seams of coal, and notably, the "big" or fourteen feet seam.

In the entire thickness there are many seams of coal, but there are only five or six of a thickness of 3 feet or over, as follows: commencing with the lowest, known as the "Parker" and "Bluebaugh" veins at the northern end of the region, and which lie near the bottom of the formation, and are crossed by the river and railroad at Piedmont.

About 150 feet above is the 6 feet seam.

" 300	" "	3	"	(Savage.)
" 380	" "	5	"	8 inch seam.
" 600	" "	5	"	9 " "
" 850	" "	14	"	of "Big Vein."

The coal from the smaller veins will hardly come into use to a great extent, while that from the other and larger, continues to be offered at so low a rate, as at present.

The following table of production for the years 1874 and 1875 is of interest in this connection:

	1874-Tons.	1875-Tons.
Cumberland of Maryland.....	2,410,895	2,342,773
Clearfield of Pennsylvania.....	639,630	915,573
Snowshoe of Pennsylvania.....	63,540	62,426
Broad Top of Pennsylvania.....	226,693	258,483
McIntyre of Pennsylvania.....	138,907	164,507
Barclay of Pennsylvania.....	337,072	376,637
Blossburg of Pennsylvania.....	796,333	581,782
West Virginia Gas Coal.....	125,000	100,000
Imports of Bituminous Coal.....	493,023	441,600

## CHICAGO, ILL.

This city is in direct rail and water communication with the Anthracite coal mines, and is therefore freely supplied at low rates. Contracts can be made at the present time with the responsible agent of the Anthracite Coal Association of Pennsylvania, for one or ten years to come, to deliver here the Lackawanna coal at \$6.25 per net ton of 2,000 pounds, and the Lehigh coal for \$7 per ton. This association owns their own roads from the mines to Buffalo and Oswego, and can lay down coal at the latter port for \$3.75 per net ton. Freights the past year have been, from Oswego to Chicago, 95 cents to \$1.65 per ton, and from Buffalo, from 40 cents to \$1 per ton. This coal is largely exported from this city to St. Louis, Missouri, Kansas and Nebraska, also to Wisconsin, Iowa and Minnesota. The screenings from this coal can be had for \$1 per ton. These are used for steam purposes.

It may be remarked that Chicago is now one of the most important markets in the country for soft coal, not only as regards its consumption for manufacturing and other purposes, but also as being the distributing point for a large section of the Northwest,

The receipts of coal at this city for the years 1874 and 1875, are shown below:

RECEIVED BY	TONS—1874.	TONS—1875.
Lake.....	661,583	743,706
Illinois and Michigan Canal.....	11,646	7,776
Chicago and Northwestern Railroad.....	2,092	5,564
Illinois Central Railroad.....	35,921	33,288
Chicago, Rock Island and Pacific Railroad.....	18,135	31,893
Chicago, Burlington and Quincy Railroad.....	27,661	5,821
Chicago and Alton Railroad.....	254,030	273,006
Chicago, Detroit and Vincennes Railroad.....	147,701	305,530
Lake Shore and Michigan Southern.....	455	778
Pittsburgh, Fort Wayne and Chicago Railroad.....	64,314	112,609
Pittsburgh, Chicago and St. Louis Railroad.....	133,232	150,349
Baltimore and Ohio Railroad.....	2,726	57,900
Michigan Central Railroad.....		3,266
Total.....	1,359,496	1,641,488

The ton weight designated in these tables is that of 2,000 pounds.

The shipments from the city are by railway, mainly by the Chicago and Northwestern Railroad, to points in the Western States.

The following tables evidence the growth of the coal trade at this city:

## RECEIPTS BY LAKE.

ANTHRACITE.			BITUMINOUS.		
Years.	Tons.		Years.	Tons.	
1870.....	340,730		1870.....	181,860	
1872.....	495,765		1872.....	90,820	
1873.....	538,837		1873.....	199,107	
1874.....	404,383		1874.....	257,200	
1875.....	474,812		1875.....	365,817	



## RECEIPTS OF ALL KINDS OF COAL,

Years.	Tons.	Years.	Tons.	
1852.....	46,233	1855.....	109,576	
1853.....	38,548	1856.....	93,020	
1854.....	56,774	1857.....	171,379	
Years.	By Lake.	By Rail	By Canal	Total tons.
1858.....	76,571	10,719	3,364	87,290
1859.....	111,506	11,766	7,922	131,204
1860.....	117,646	6,218	7,216	131,080
1861.....	163,879	2,407	12,803	184,089
1862.....	195,099	7,681	15,643	218,423
1863.....	244,624	12,066	27,506	284,196
1864.....	251,038	43,991	28,246	323,275
1865.....	288,771	41,023	15,060	344,854
1866.....	385,906	86,675	23,612	496,193
1867.....	391,313	140,319	14,576	546,208
1868.....	450,137	197,152	10,945	658,243
1869.....	510,876	279,798	8,326	799,000
1870.....	522,580	364,894	.....	887,474
1871.....	515,253	562,043	4,176	1,081,472
1872.....	586,585	804,226	7,213	1,393,024
1873.....	737,944	913,205	17,118	1,668,257
1874.....	661,583	686,267	11,646	1,359,496
1875.....	748,706	885,004	7,778	1,641,488

## SHIPMENTS OF ALL KINDS OF COAL FROM CHICAGO.

Years.	Tons.	Years.	Tons.
1852.....	1,441	1864.....	16,779
1853.....	2,998	1865.....	24,190
1854.....	5,948	1866.....	34,190
1855.....	12,153	1867.....	69,170
1856.....	16,161	1868.....	83,399
1857.....	23,942	1869.....	95,620
1858.....	15,641	1870.....	110,467
1859.....	19,886	1871.....	96,833
1860.....	20,364	1872.....	177,687
1861.....	20, 93	1873.....	243,637
1862.....	12,947	1874.....	252,872
1863.....	15,245	1875.....	365,817

Details of the business for the year 1875, are shown below:

SHIPMENTS.		RECEIPTS.	
	Anthracite Tons.		Anthracite. Bituminous. Tons. Tons.
By Lake.....	677	51	474,812 273,894
Illinois and Michigan Canal.....	.....	7,584	..... 7,778
Chicago and Northwestern Railroad....	50,000	180,624	..... 564
Illinois Central Railroad.....	13,597	.....	..... 35,288
Chicago, Rock Island and Pacific R'd..	23,204	.....	..... 31,893
Chicago, Burlington and Quincy R. R..	29,891	.....	..... 5,821
Chicago and Alton Railroad.....	14,070	.....	..... 275,006
Chicago, Detroit and Vincennes R. R....	852	.....	..... 205,530
C. M. & St. P. R. R.....	.....	35,686	..... ..
Chicago and Pacific Railroad.....	2,500	2,849	..... ..
Michigan Central Railroad.....	.....	948	3,266 .....
Lake Shore and Michigan Southern.....	.....	764	778 .....
Pittsburgh, Fort Wayne and Chicago..	1,320	.....	..... 112,609
Pittsburgh, Chicago and St. Louis.....	1,102	.....	..... 150,349
Baltimore and Ohio Railroad.....	.....	82	..... 57,990

## SAN FRANCISCO, CAL.

The statement given below will indicate at a glance the increased consumption of the several varieties at San Francisco.

	1869.	1870.	1871.	1872.
Foreign.....	109,000	135,163	113,433	174,212
Eastern.....	33,600	30,320	13,291	23,669
Domestic.....	184,100	167,183	183,420	230,586
Total.....	331,700	333,171	315,194	434,467
		1873.	1874.	1875.
Foreign.....		181,834	227,952	255,790
Eastern.....		27,167	29,738	29,133
Domestic.....		221,034	274,257	253,281
Total.....		431,039	531,947	538,209

Details of the business for 1875, are as below :

Foreign : Australian, 136,869 tons ; English, 57,849 tons ; Vancouver, 61,072 tons.

Eastern ; Anthracite, 18,810 tons ; Cumberland, 10,328 tons.

Domestic : Mt. Diablo. 142,808 tons ; Coos Bay, 32,869 tons ; Bellingham Bay, 10,445 tons ; Seattle, 67,106 tons ; Rocky Mountain, 53 tons.

The ton weight is that of 2240 lbs.—

The following is of interest, as showing the relative value of the coals found on the Pacific coast compared with the coal from the Cumberland region in Maryland :

	A	B	C	D	E	F
Alaska.....	7.94	7.96	60.0	40.0	12.3	5.41
Coos Bay.....	10.24	7.35	60.7	39.3	6.2	6.91
Seattle.....	8.38	8.57	63.0	37.0	16.6	5.71
Black Diamond.....	8.38	8.73	51.6	48.4	8.0	5.71
Bellingham Bay.....	10.53	5.51	67.0	33.0	16.0	7.21
California Anthracite.....	9.70	6.12	83.6	11.4	5.0	6.61
Cumberland, Maryland.....	13.92	3.52	88.2	11.8	3.2	9.48

EXPLANATION.—A, heating power, one pound water ; B, sulphur to ton, in pounds ; C, coke per cent ; D, Volatile matter ; E, Ash per cent ; F, relative value per pound.

## ST. LOUIS, MO.

By far the largest proportion of the Bituminous coal received at this city is from the Belleville district, in St. Clair county, Illinois ; the principal seam worked is five to seven feet in thickness, and is economically mined. Analysis of this coal shows, Water 6 ; Volatile matter 38.8 ; Fixed Carbon 55.2 ; Ash 5.

The Iron Mountain Railroad brings the Semi-Anthracite coal known as the "Spadra" from Arkansas to this city, a description of its qualities will be found in the proper place.

The following statement shows the coal trade of St. Louis for 1874 and 1875 :

## ROUTES OF TRANSPORTATION.

	1874. TONS.	1875. TONS.
Belleville and Southern Illinois Railroad.....	311,185	350,756
Illinois and St. Louis Railroad.....	196,956	204,624
Ohio and Mississippi Railroad.....	161,390	160,467
St. Louis and Southeastern Railroad.....	161,766	173,232
St. Louis, Vandalia, Terre Haute, and Ind. Railroad.....	121,435	191,012
Indianapolis and St. Louis Railroad.....	24,880	12,776
Cairo and St. Louis Narrow-gauge.....	84,150	107,164
Chicago, Alton and St. Louis Railroad.....	6,500	1,730
Toledo, Wabash and Western Railroad.....	2,100	18,250
Rockford, Rock Island and St. Louis Railroad.....	1,500	1,500
Iron Mountain and Southern Railroad.....	1,755	993
St. Louis County wagon receipts (estimated).....	64,000	75,000
Ohio and Cumberland River (Barges).....	15,415	53,120
Lower Mississippi River.....	2,300	1,890
Illinois River.....	1,320	1,500
Pittsburgh gas coals.....	41,000	50,000
Other sources.....	500	1,500
Total receipts.....	1,196,622	1,274,219

Tons of 2,000 lbs ; 25 bushels of 80 lbs. each, to the ton.—

## BUFFALO, N. Y.

The distribution of the coal received here is divided into city trade for family use, rolling mills, furnaces, manufactories and gas works ; interior trade for gas works, family use and manufacturing purposes ; and all points of the West are supplied principally with Anthracite, which is taken by vessels from this port to Chicago, Milwaukee, Duluth, etc.

The receipts for a series of years have been as below :

Year.	BITUMINOUS.			—ANTHRACITE.—	
	By Lake.	By Canal.	By L. S. & M. S. R. R.	By Canal.	By Rail.
1863.....	71,323	12,551	.....	123,319	.....
1864.....	65,274	35,237	.....	154,214	.....
1865.....	68,141	42,322	.....	143,995	.....
1866.....	68,142	62,172	.....	248,716	.....
1867.....	101,107	67,124	.....	223,718	.....
1868.....	91,467	73,596	.....	318,353	.....
1869.....	99,460	108,972	.....	112,914	137,000
1870.....	94,796	163,437	.....	177,027	250,000
1871.....	88,511	80,660	76,063	102,185	300,000
1872.....	78,879	95,500	109,397	190,994	330,000
1873.....	87,724	125,000	190,000	255,044	479,885
1874.....	67,467	70,000	140,000	252,262	320,000
1875.....	32,767	45,000	350,000	250,206	500,000

The shipments of Bituminous eastward by canal from Buffalo were as below :

1863.....	20,125	1869.....	62,690
1864.....	30,043	1870.....	65,900
1865.....	28,283	1871.....	60,522
1866.....	50,202	1872.....	53,198
1867.....	57,495	1873.....	68,210
1868.....	59,766	1874.....	46,995
1875.....	23,100		

There was 80,000 tons of Blossburg Semi-Bituminous received in 1873, 50,000 tons in 1874, and 75,000 tons in 1875 by railroad. The amount of Anthracite that was shipped westward, via the lakes, 510,443 tons in 1873, 344,500 in 1874, and 339,722 tons in 1875. There was 60,000 tons of Blossburg Semi-Bituminous shipped west, via the lakes in 1873, 40,000 in 1874 and 50,000 tons in 1875.

Freights ranged from 50 cents to \$1.00 per ton to Chicago, Ills.

The ton weight in use here is that of 2,000 lbs.



**MOBILE, ALA.**

The *Mobile Register* in its annual review dated September 1st., 1875, says: The past year, similar to the previous season, has been very unsatisfactory to our coal dealers; the demand has been principally for household purposes, and in consequence of the exceedingly mild winter, consumption has been moderate. The boats, presses and manufactories continue to use pine wood (lightwood), which can be freely obtained at about \$3.00 per cord—making a fuel so cheap as to prevent the substitution of coal until it can be furnished at a considerably reduced price from present rates. We anticipated in our last annual statement the opening of a trade in Alabama coal with Cuba and Texas, but as yet no shipments have been made, although samples have been sent to Mexico, Cuba and St. Thomas, and our dealers have encouragement to hope that they will soon receive test orders. The railroads freight the Alabama coal at as low a figure as they can afford, yet the cost is too high for very successful competition with the Cumberland and Anthracite coals. If our upper rivers were made navigable, good steam coal could be supplied at this port from \$3.00 to \$4.00 per ton, and a large trade would soon be established. The following are the comparative receipts for four years:

	1872.	1873.	1874.	1875.
Pennsylvania and English.....	8,359	8,069	5,830	4,176
Alabama.....	1,561	1,166	1,154	1,801

**PITTSBURGH, PA.**

The amount of business that is done at this city in coal and coke, including that sent to other points, amounts to 4,350,000 tons (of 2,000 pounds) per year.

The business of the Monongahela slack-water navigation in 1875 amounted to 2,046,967 tons of coal and 38,308 tons of coke.

During last year there was quite a business done in Anthracite coal.

The rapid growth of the coke trade of Pittsburgh and vicinity is a most significant illustration of its industrial development. Of this trade, what is known as Connellsville coke forms a large part, and will continue to do so. It is mined in Fayette county, Pa. It is stated that an acre will yield, over and above the pillars, if properly mined, 13,300 tons. It weighs 80 lbs. to a bushel, and when properly coked, 100 bushels of coal produce 125 bushels of coke, and the coke weighs 40 pounds to a bushel; that is, a given quantity of the coal gains one quarter in bulk and loses three-eighths of its weight, or 100 pounds of coal makes 62½ pounds of coke. This coke has become very celebrated not only about Pittsburgh, but throughout the Western States, where it is extensively used for foundry purposes in melting pig iron, selling in competition with Lehigh coal. It is used in blast furnaces for smelting iron from the ore, and is sometimes mixed with the

Western coals. It is also an excellent fuel for locomotive use. Its freedom from sulphur has given this coke the reputation of being the best known. An analysis made by J. B. Britton of a sample of Connellsville coke, average of forty-nine pieces, shows :

Moisture.....	.49	Phosphoric acid.....	.03
Ash.....	11.33	Carbon.....	87.45
Sulphur.....	.69		

The ash of the coke contained 47 per cent of silica and 47 per cent of alumina.

The receipts during the years 1874 and 1875 are as below :

BITUMINOUS COAL IN TONS OF 2,000 LBS.

Route of Transportation.	1874.	1875.
Allegheny Valley Railroad.....	240,165	271,725
Castle Shannon Railroad.....	122,925	97,323
Pittsburgh and Connellsville Railroad.....	453,976	325,000
Pennsylvania Railroad.....	533,777	331,843
Pittsburgh, Charleston and West Virginia Railroad.....	30,096	43,980
Pittsburgh, Cincinnati, and St. Louis Railroad.....	210,222	249,691
Saw Mill Run Railroad.....	89,676	90,047
Monongahela Slack-water.....	2,196,153	2,046,967
West Pennsylvania Railroad. Estimated.....	194,005	150,000
Total.....	4,021,000	3,606,673

COKE IN TONS OF 2,000 LBS.

Connellsville Railroad.....	630,727	550,000
Pennsylvania Railroad.....	512,783	422,903
West Pennsylvania Railroad.....	46,169	45,000
Monongahela Slack-water.....	32,375	38,369
Total.....	1,222,056	1,056,211

The above schedule was prepared by the *American Manufacturer*.

Grand Total coal and coke receipts ; for 1874, 5,243,056 tons, for 1875, 4,662,889 tons.

## BALTIMORE, MD.

At this city an extensive business in coal, both Anthracite and Bituminous, is done. At Locust Point, the terminus of the Baltimore and Ohio Railroad, on the environs of this fine city, is the shipping point for immense quantities of Bituminous coal from the Cumberland region of Maryland, the Gas coal regions of West Virginia, the Somerset county mines and the Youghiogheny Gas coal of Pennsylvania.

The highest price at which the Cumberland coal has been sold at Baltimore, was in March, 1865, when the price was \$14 per ton ; it rapidly declined, until, in December of the same year, the price was but \$7 40 per ton. The trade in Anthracite at present is entirely local, none being shipped from Baltimore to other and more distant points.

There are some 350,000 tons of Anthracite received yearly at Baltimore, by the following routes : From Millersburg, Pa., 112 miles, the Lykens

Valley Red Ash ; from Sunbury, Pa., 138 miles, the White Ash ; by Susquehanna tide water canal ; from Port Richmond, Philadelphia.

Little or no Lehigh coal reaches Baltimore. The Anthracite is usually of good quality. All the sales are 2,240 pounds to the ton. Anthracite sold as high as \$13.50 per ton or Lump coal, in May, 1865.

The gross rates of transportation, on coal for shipment at Locust Point over the Baltimore and Ohio Railroad, during 1875, were as below :

Cumberland to Locust Point.....	\$2.05
Piedmont to Locust Point.....	2.40
Newburg to Locust Point.....	4.25
Clarksburg and Fairmount to Locust Point.....	4.75

per ton of 2,000 lbs., with a drawback off Gas coal reshipped North and East.

The shipments from Baltimore of Cumberland coal to foreign ports were as below :

1871.....	20,207	1873.....	59,546
1872.....	54,363	1874.....	70,675
1875.....			33,460

The Northern Central Railroad took 276,784 tons of Anthracite to Baltimore in 1875, against 232,938 in 1874, 242,754 tons in 1873 and 244,757 tons in 1872.

The amount of West Virginia Gas coal that is received averages about 200,000 tons annually, being 217,569 tons in 1872, and 190,673 tons in 1873. There were also shipped during 1874 some 30,000 tons of Youghiogheny Gas coal, and 60,000 tons in 1875 ; received from Western Pennsylvania by the Pittsburgh and Connellsville branch of the Baltimore and Ohio Railroad.

The Pennsylvania Railroad carried the coal from the Clearfield region, to Baltimore in 1875, by its Northern Central line.

The following schedule shows the business of the Baltimore and Ohio Railroad Company, giving the disposition of the coal that paid freight (coal for the use of the company not included) :

Fiscal Years.	Received at Locust Point.	To Baltimore.	Line Trade.
1862.....	150,987	8,740	978
1863.....	277,505	26,106	3,926
1864.....	302,277	56,191	1,103
1865.....	353,434	49,396	5,340
1866.....	620,688	77,356	20,967
1867.....	629,946	58,377	7,615
1868.....	696,465	39,766	29,780
1869.....	1,187,366	136,704	33,910
1870.....	1,069,390	113,929	36,319
1871.....	1,438,816	113,286	39,500
1872.....	1,482,240	60,630	118,389
1873.....	1,806,529	65,694	147,195

**BUSINESS OF 1874.**—The Baltimore and Ohio Company state that the amount of coal carried for the year ending in 1874 was 1,407,377 tons, but



do not furnish the details of distribution, or, as to how much was Cumberland, and West Virginia Gas, or Youghiogheny coal.

The year of the Baltimore and Ohio Railroad ends October 31.

### CINCINNATI, OHIO.

There is an increasing business done in coal at this city. The qualities received embrace Youghiogheny from the neighborhood of Pittsburgh, Pa.; the Pomeroy from the vicinity of Pomeroy, Ohio; Hocking Valley, Ohio; the Kanawha from West Virginia, including the Splint, Bituminous and Cannel; and the Anthracite from Pennsylvania.

Of Anthracite coal, the quantity consumed in this city is small, not exceeding during the past year, 248,750 bushels. The price delivered to dealers is about \$9.87 per ton.

The shipments of coal from this city to interior towns have decreased during 1874-75 amounting to 5,002,500 bushels against 5,933,100 bushels in 1873-74, and 4,472,400 bushels in 1872-73.

The following table shows the receipts of coal of the various kinds at this city.

KINDS.	BUSHELS.	
	1873-74.	1874-75.
Youghiogheny.....	24,014,681	24,225,002
Ohio River.....	10,398,153	4,277,327
Kanawha.....		4,476,619
Cannel.....	710,000	569,352
Anthracite.....	112,000	248,750
Muskingum Valley.....		312,000
Hocking Valley.....		636,000
Other receipts.....		649,250
Totals.....	35,234,834	35,394,300

The following table shows the average annual quotation for Youghiogheny coal, delivered.

YEAR.	CTS. PER BUSHEL.	YEAR.	CTS. PER BUSHEL.
1863-64.....	38.34	1869-70.....	15.27
1864-65.....	26.13	1870-71.....	15.82
1865-66.....	24.42	1871-72.....	22.68
1866-67.....	17.86	1872-73.....	20.72
1867-68.....	22.01	1873-74.....	16.04
1868-69.....	14.69	1874-75.....	14.00

It must be remembered, however, that this is by no means the average price of the coal consumed, for these averages depend on the regular weekly quotations, and to take them as the measure of the average price, would be to assume that equal quantities were consumed at the different seasons of the year, which would be fallacious. For comparative purposes, these figures are the best that can under the circumstances be furnished, but for absolute cost they are unsafe criteria.

A noticeable feature of the coal trade in this city is the more general use of coke as a fuel for the household. While the quantity used for manufacturing has, from the very nature of the cause, suffered material diminution this has found at least partial compensation in the growing demand for other purposes. Crushed coke, a new article of fuel, which was introduced a short time ago, has been largely consumed, and has been shipped in considerable quantities to other cities. The business for the year is placed at 2,675,000 bushels, compared with 2,850,000 during the preceding year. Gas coke has ranged from 7 to 8 cents per bushel at the works, with an extra charge for delivery of from 2 to 4 cents per bushel, according to location. The average quotation per bushel during the year, for the various kinds of coke, has been as follows:—City manufactured, at yard, 11 cents delivered, 13.1; Gas House, at yard, 7.75, delivered, 10.7; Connellsville delivered, 15.58; Mc Keesport, delivered, 11.13; Crushed, at yard, 11.25 delivered, 14.25.

While Youghiogheny has not varied much in quantity, and the demand for Ohio River coal has fallen off, the quantity of Kanawha coal received has steadily increased. A new feature of the business in this city is the completion of the arrangements for the receipt of the Hocking Valley coal over the Marietta and Cincinnati Railroad. Extensive and permanent depots have been established at Brighton Station, on the Cincinnati and Baltimore Railway, and the work of receipt and distribution has been successfully established. As to what effect the receipt of coal by rail, on an extensive scale, will hereafter have upon the market, remains to be seen; but it will, at any rate, test the foundation for the hopes entertained by many for years that the solution of the question of low prices and equable supply was to be found through the instrumentality of the railroads.

The following table will show the number of bushels of coal of all kinds received at Cincinnati, for the years named:

YEAR.	BUSHEL.	YEAR.	BUSHEL.
1853-54.....	8,158,000	1864-65.....	16,467
1854-55.....	10,356,000	1865-66.....	18,022
1855-56.....	7,500,000	1866-67.....	18,446
1856-57.....	14,500,000	1867-68.....	17,500
1857-58.....	15,000,000	1868-69.....	25,500
1858-59.....	12,392,701	1869-70.....	30,800
1859-60.....	14,600,000	1870-71.....	22,972
1860-61.....	12,500,000	1871-72.....	30,790
1861-62.....	8,500,000	1872-73.....	37,274
1862-63.....	8,000,000	1873-74.....	35,234
1863-64.....	15,975,366	1874-75.....	35,360

It is safe to calculate the bushel at eighty pounds, which would give twenty-eight to the ton of 2,240 lbs.

For the figures given above we are indebted to Col. Sydney D. Maxwell, Superintendent of Cincinnati Chamber of Commerce.

## PROVIDENCE, R. I.

The total amount of coal reported as received at this port during the year 1875, was 603,510 tons, of which amount 602,847 tons was domestic and only 663 tons foreign. The total receipts of coal for 1874 were 539,169 tons, of which 532,564 tons were domestic and 6,604 tons foreign; showing a gain of 70,282 tons of domestic, and a loss of 5,941 tons of foreign. Total receipts for 1873 were 634,112 tons domestic, 3,232 foreign, in all 637,344 tons, or 33,835 tons more than during last year. For 1872, 623,842 tons domestic, 9,454 tons foreign, total, 633,387, or 29,877 tons more, in all, than in 1875. For the year 1871, 504,006 tons domestic, 13,900 tons foreign; total, 517,996 tons, or 85,514 tons less than during the year 1875.

## NEW ORLEANS, LA.

The *Price Current* in its annual review for the year ending Sept. 1st, 1875, says :

"The coal brought to this market is almost exclusively Pittsburgh coal. The flats and barges are towed by powerful towboats built expressly for that purpose. The towing between Pittsburgh and Louisville depends on the state of the river. When the stage of water is too low for navigation, which it frequently is for weeks; and even months, the supplies at the lower points become deficient and prices naturally advance, often reaching very high figures. The coal flats and barges sent to New Orleans are generally dropped at Willow Grove, near Greenville, just above the city, where they are superintended for the owners or agents. When a boat or barge is wanted a small city tugboat is sent to tow it to the city, or to its destination on the coast. The aggregate consumption for six years—1869, 1870, 1871, 1872, 1873, 1874, were as below :

		Bbls.	Tons.
Boats.....	1,887	15,614,500	1,419,500
Barges.....	569	2,560,500	232,772
Total.....	2,406	18,175,000	1,652,272
AVERAGE FOR ONE YEAR.			
Boats.....	306	2,501,000	236,454
Barges.....	95	427,500	38,863
Total.....	401	3,028,500	275,317

The largest amount of coal consumed in the past six years, was 301,555 tons in 1869, and the least, 248,136 tons in 1874."

Messrs. C. A. Miltenberger & Co., give the following as the consumption of Pittsburgh coal at this port :



	Bbls.		Bbls.
Consumption 1869.....	3,317,099	Consumption 1873.....	2,841,500
" 1870.....	3,203,600	" 1874.....	2,749,500
" 1871.....	2,112,000	" 1875.....	2,448,000
" 1872.....	2,991,500		

The coal sent to planters below the city is included in the consumption, while that left on the coast above is not considered.

French Creeks are classed as barges, and Hulls as boats.

Average contents, boats about 9,000 bbls. Barges 4,500 bbls.

The average cost of carrying coal from Pittsburgh to New Orleans, (the round trip) is stated at 1-64th of a cent per ton, per mile.

## RICHMOND, VA.

Our friends at this city kindly forward the following statistics of the coal trade for the years 1874 and 1875.

Receipts.	Tons, 1874.	Tons, 1875.
Via Richmond and Danville Railroad, Chesterfield County coal.....	18,690	14,500
Via Richmond and Petersburg Railroad (Clover Hill), Chesterfield County coal.....	17,104	16,592
Via River Potomac, and Fredericksburg Railroad, Henrico County coal.....	2,000	2,500
Via canal, Carbonite, coke and coal.....	20,440	19,301
Via dock (Cumberland and Anthracite), Northern coal.....	69,098	49,700
Via Chesapeake and Ohio Railroad, to James River.....	75,621	80,000
" " city.....		20,000

## COAL AT BOSTON, MASS.

The comparative receipts for the years 1874 and 1875 are shown below :

From	Tons, 1874.	Tons, 1875.
Alexandria, Virginia.....	86,705	97,697
Georgetown, District of Columbia.....	27,753	20,567
Philadelphia, Pennsylvania.....	578,432	623,245
Baltimore, Maryland.....	197,513	163,793
Other places (New York, etc.).....	235,113	290,271
Great Britain.....	2,780	2,738
Nova Scotia.....	48,658	29,706
Totals.....	1,175,954	1,233,022

The receipts of foreign and domestic coal at this port have been as follows :

Years.	Foreign. Tons.	Domestic. Tons.	Years.	Foreign. Tons.	Domestic. Tons.
1875.....	32,444	1,200,578	1868.....	103,901	742,483
1874.....	51,438	1,125,516	1867.....	117,440	630,223
1873.....	57,700	1,076,573	1866.....	159,330	676,371
1872.....	90,739	1,068,781	1865.....	209,223	538,911
1871.....	109,013	822,808	1864.....	188,786	516,601
1870.....	115,022	819,890	1863.....	180,445	589,911
1869.....	110,466	764,017			

These figures include all the coal going to this port, both for the home trade, and for the points reached by the railroads centering here.

The *Boston Commercial and Shipping List* gives the following as the following as the highest and lowest prices of Anthracite and Provincial coal, at the city of Boston.

Years.	Anthracite, per ton.	Nova Scotia, per ton.
1875.....	\$7.00 @ \$9.00	\$5.25 @ \$6.25
1874.....	7.00 9.00	5.75 7.75
1873.....	8.00 10.00	7.00 9.00
1872.....	7.00 10.00	6.00 8.50
1871.....	7.00 10.00	5.75 7.00
1870.....	7.00 11.00	5.75 7.25
1869.....	7.50 11.00	7.25 9.00
1868.....	7.00 12.00	7.50 9.00
1867.....	7.50 10.00	7.25 9.25
1866.....	9.00 12.00	7.50 9.50
1865.....	8.75 17.00	6.25 18.00

### CLEVELAND, OHIO.

This city receives as fine and varied an assortment of Bituminous coal as any city in the world. A great many coal basins—in fact, nearly all the Ohio formation, as well as most of the coals lying west of the Allegheny Mountains, in Pennsylvania—here find a market and a distributing point for the West, Northwest, Eastern and Canada trade,

The great number of vessels employed in the iron ore and lumber trade naturally seek coal as a back freight for ballast, which enables Cleveland to place coal in distant ports, like Chicago, Milwaukee and Lake Superior, at mere nominal rates. The bulk of the business has been developed within the last fifteen years, and, taking the rapid growth of the manufacturing interests in the West into consideration, it is safe to presume that the trade has not yet reached its ultimate proportions.

The total receipts of coal at Cleveland from 1828 to 1852 amounted to 662,862 tons, and increasing from thirty tons in 1828 to 137,926 tons in 1852, mined as below :

Year.	District.	Tons for the year.
1828	Tallmadge.....	30
1829	Tallmadge.....	708
1830	Tallmadge.....	1,178
1840	Tallmadge, New Castle, Trenton.....	6,028
1850	Tallmadge, Clinton, New Castle, Youngstown, Cuyahoga Falls, Girard and Rochester.	83,850
1851	Tallmadge, Clinton, New Castle, Youngstown, Cuyahoga Falls, Girard and Rochester.	107,135
1852	Tallmadge, Clinton, New Castle, Youngstown, Cuyahoga Falls, Girard and Rochester.	137,926

The canal from Akron was opened July 4, 1828, and during that year the thirty tons of coal sent to Cleveland was received by this canal route. The coal was taken from the mines to the canal with teams, to be shipped, and the business was continued in this way until 1832, when the canal

reached the coal fields near Massillon, which were on its banks. The receipts by this route represents the consumption of coal at Cleveland up to 1838. It was not until after this, and after the Briar Hill coal began to reach this place, in 1843, that lake steamers could be induced to use it. Since 1845 it has supplanted wood on the steamers of the lower lakes.

Until 1845 the entire trade of the lakes in Bituminous coal was in the hands of Cleveland dealers. About this time, possibly a year or two earlier, Erie began to ship coal, the joint receipts from the interior of the two places being only 45,136 tons:

The Bituminous coals received at Cleveland may be classed as follows:

Briar Hill or Block coal from the Mahoning region—reach Cleveland via A. & G. W. Railroad.

Massillon coal region—via C. & P. Railway and Canal.

Tuscarawas coal region—via L. S. & T. V. Railway, and C. & P. Railway.

Salinesville and Hammondsville region—via C. & P. Railway.

Sterling—via C. & P. Railway.

Pittsburgh coal region—via C. & P. Railway.

Straitsville—via C. C. & I. Railway.

Hocking—via C. C. & I. Railway.

Statistics in regard to the tonnage have not been very carefully preserved, but the following table may be relied upon as not being over-estimated, as it is compiled from the returns of the different transportation companies.

	Receipts.	Shipments.	Used in Cleveland.
1865.....	465,550	236,000	229,550
1866.....	533,407	295,280	283,127
1867.....	663,026	334,027	334,999
1868.....	759,104	392,928	366,176
1869.....	922,757	495,800	426,957
1870.....	934,600	482,306	422,210
1871.....	1,165,940	633,765	532,115
1872.....	1,343,160	745,595	602,565
1873.....	1,599,212	854,862	744,350
1874.....	1,099,000	500,000	599,000

The amount of Anthracite coal received at this city is very small, amounting to but 36,358 tons in 1874. The amount of *shipments* in 1875 was 529,211 tons coastwise, and 140,637 tons to the British Provinces.

The ton designated is that of 2000 lbs.



## IMPORTS AND EXPORTS OF COAL.

By the courtesy of Dr. Edward Young, Chief of the Bureau of Statistics, at Washington, D. C., we are enabled to give the following in regard to the imports and exports of coal into and from the United States :

IMPORTS.		EXPORTS.	
Years.	Tons.	Years.	Tons.
1870.....	420,688	1870.....	227,918
1871.....	443,955	1871.....	277,951
1872.....	490,631	1872.....	401,078
1873.....	458,015	1873.....	584,633
1874.....	438,028	1874.....	763,402
1875.....	441,600	1875.....	519,345

Details for the fiscal year ending June 30, 1875, are as below :

	DOMESTIC EXPORTS.		IMPORTS.
	Bituminous.	Anthracite.	Bituminous.
Argentine Republic.....		222	.....
Brazil.....	1,189	1,229	104
Central American States.....	1	36	.....
Chile.....	1,220	235	.....
China.....		4,088	.....
Danish West Indies.....	3,946	858	11
France.....		.....	453
French West Indies.....	3,033	100	26
Miquelon, Langaiay and St. Pierre.....		79	.....
Germany.....		.....	725
England.....		.....	103,154
Scotland.....		.....	14,352
Nova Scotia, New Brunswick, &c.....	2,512	19,990	127,999
Quebec, Ontario, &c.....	137,653	245,726	115
British Columbia.....	72	5	53,823
Newfoundland and Labrador.....		529	.....
British West Indies.....	2,577	778	17
British Guiana.....		.....	1
Hong Kong.....		743	2
British Australasia.....		716	129,959
Havti.....		67	.....
Italy.....		.....	9
Japan.....		1,339	.....
Mexico.....	3,124	4,118	3
Peru.....		50	5
Azore, Maderia and Cape Verde.....		10	12
Sandwich Islands.....	68	2,975	.....
Cuba.....	33,005	21,313	201
Porto Rico.....	153	23	.....
Spanish Possessions in Africa.....		4	.....
“ “ all other.....	150	.....	.....
Turkey in Africa.....		.....	5
U. S. of Columbia.....	14,107	11,078	15
Uruguay.....	249	.....	4
Venezuela.....	30	25	.....
All other countries and ports in Africa.....		120	.....
Total.....	203,189	316,156	441,600

N. B.—The Foreign Re-Exports during the fiscal year 1875 amounted to 5 tons—\$110.

## NOVA SCOTIA.

Nova Scotia coal was admitted into the United States free of duty during the years 1854 to 1865, and the average annual production of those twelve years was only 333,427 tons. A monopoly of these regions was granted to the Duke of York in 1826, but it was relinquished in 1857. The most important regions are Pictou, and Sydney or Cape Breton, as will be seen from the tables of the production. New Brunswick possesses a mine of what is called Albertite, a variety of asphalt which yields 100 gallons of crude oil to the ton, or 14,500 cubic feet of gas. It was discovered in 1849. The Pictou field is said to contain some 28 square miles, but the available space for working is much less. The most extensive is the Cape Breton field. It extends about thirty-five miles along the coast, and ranges from four to five miles in width.

Mr. H. S. Poole, Government Inspector of Mines, furnishes the following summary of the coal sales of Nova Scotia from 1785 to 1874.

Years.	Tons.	Years.	Tons.
1785 to 1790.....	14,349	1831 to 1840.....	839,981
1791 " 1800.....	51,048	1841 " 1850.....	1,533,798
1801 " 1810.....	70,452	1851 " 1860.....	2,399,829
1811 " 1820.....	91,527	1861 " 1870.....	4,927,339
1821 " 1830.....	140,820	1871 " 1874.....	3,012,565

The above table is probably as nearly correct as can now be determined and if 13 per cent be allowed for colliery consumption 1,700,622 tons must be added making the total quantity actually raised 14,782,330 tons.

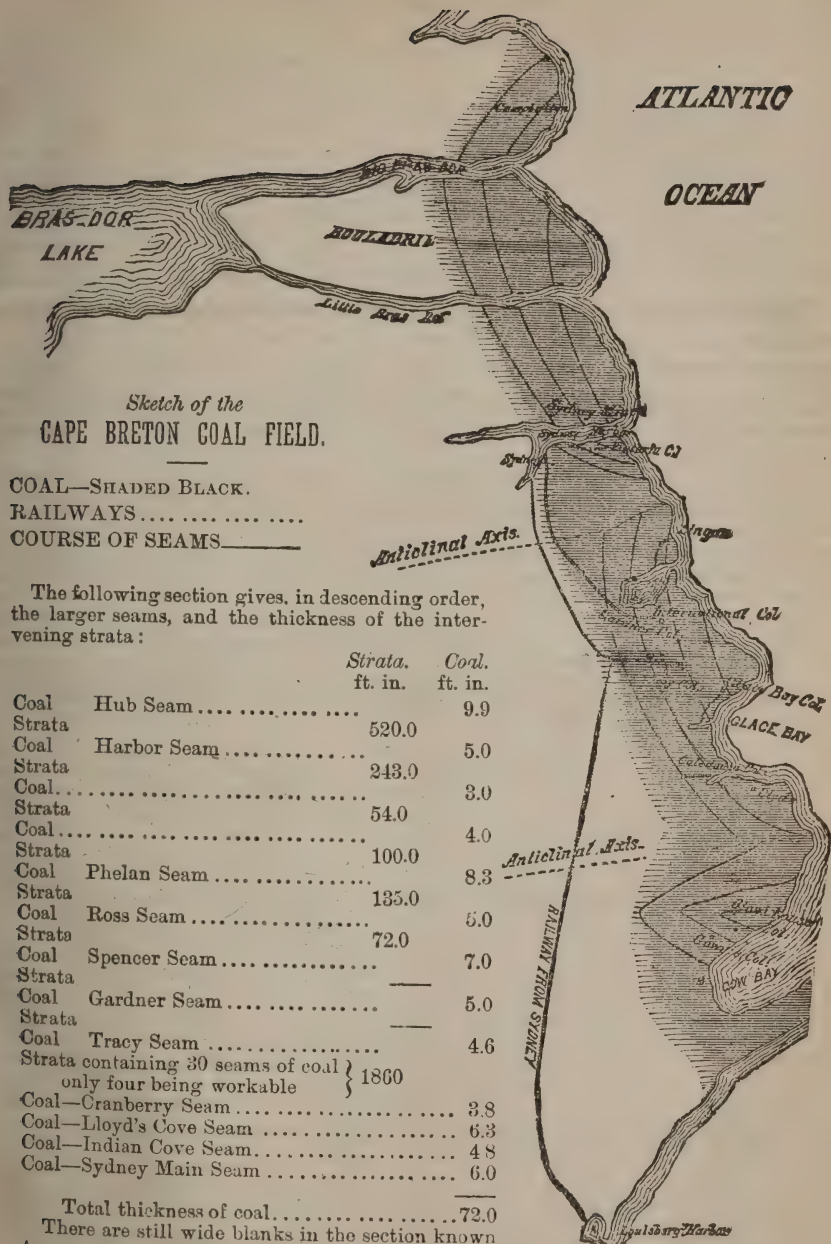
The number of tons actually raised during a term of years is shown in the following schedule :

Year.	Tons.
1864.....	562,102
1865.....	715,786
1866.....	664,993
1867.....	517,325
1868.....	462,183
1869.....	573,062
1870.....	623,769
1871.....	673,242
1872.....	889,950
1873.....	1,051,467
1874.....	872,720
1875.....	781,163

The colliery consumption for 1875, was 15 per cent or 124,110 tons.—

During the year 1875, freights from the Provinces ruled very low, and prices at the shipping ports were also low, yet the output was less even than in 1874, and a great decrease from the business of 1873; this is no doubt owing to the low prices of American coals, and the general dullness of manufacturing of every description, during that year.

The average prices of Nova Scotia coal, delivered at Boston, Mass., together with the amount of Nova Scotia coal received into the whole United States, for fiscal year ending June 30th, are stated in the following schedule:



Sketch of the  
CAPE BRETON COAL FIELD.

COAL—SHADED BLACK.  
RAILWAYS .....  
COURSE OF SEAMS——

The following section gives, in descending order, the larger seams, and the thickness of the intervening strata:

	Strata. ft. in.	Coal. ft. in.
Coal Hub Seam .....		9.9
Strata .....	520.0	
Coal Harbor Seam .....		5.0
Strata .....	243.0	
Coal .....		3.0
Strata .....	54.0	
Coal .....		4.0
Strata .....	100.0	
Coal Phelan Seam .....		8.3
Strata .....	135.0	
Coal Ross Seam .....		5.0
Strata .....	72.0	
Coal Spencer Seam .....		7.0
Strata .....		
Coal Gardner Seam .....		5.0
Strata .....		
Coal Tracy Seam .....		4.6
Strata containing 30 seams of coal only four being workable	} 1860	
Coal—Cranberry Seam .....		3.8
Coal—Lloyd's Cove Seam .....		6.3
Coal—Indian Cove Seam .....		4.8
Coal—Sydney Main Seam .....		6.0

Total thickness of coal.....72.0

There are still wide blanks in the section known to contain coal seams, but we are not in possession of sufficient information to give details as to their size and position. In the Cape Breton coal measures there are over 4,500 feet of productive strata.



Year.	Price per ton.	Yearly receipts.
1863.....	\$7.40	282,774 tons.
1864.....	10.40	347,594 tons.
1865.....	9.60	465,104 tons.
1866.....	8.54	404,252 tons.
1867.....	8.10	338,482 tons.
1868.....	8.16	228,132 tons.
1869.....	7.78	257,485 tons.
1870.....	6.50	168,180 tons.
1871.....	6.54	165,431 tons.
1872.....	7.00	154,092 tons.
1873.....	7.75	232,409 tons.
1874.....	7.00	265,288 tons.
1875.....	6.00	128,114 tons.

The sales and shipments for the year 1875, were derived from the following sources :

Cumberland County.....	69,944 tons.
Pictou.....	337,102 tons.
Cape Breton.....	304,702 tons.
Other Counties.....	4,047 tons.
Total.....	706,795 tons.

The destination of this coal was as below :

To Nova Scotia.....	212,630 tons.
To New Brunswick, P. E. Island and Quebec.....	319,363 tons.
To Newfoundland.....	72,348 tons.
To United States.....	89,746 tons.
To West Indies.....	16,429 tons.
To South America.....	4,779 tons.
To Great Britain and East Indies.....	1,500 tons.

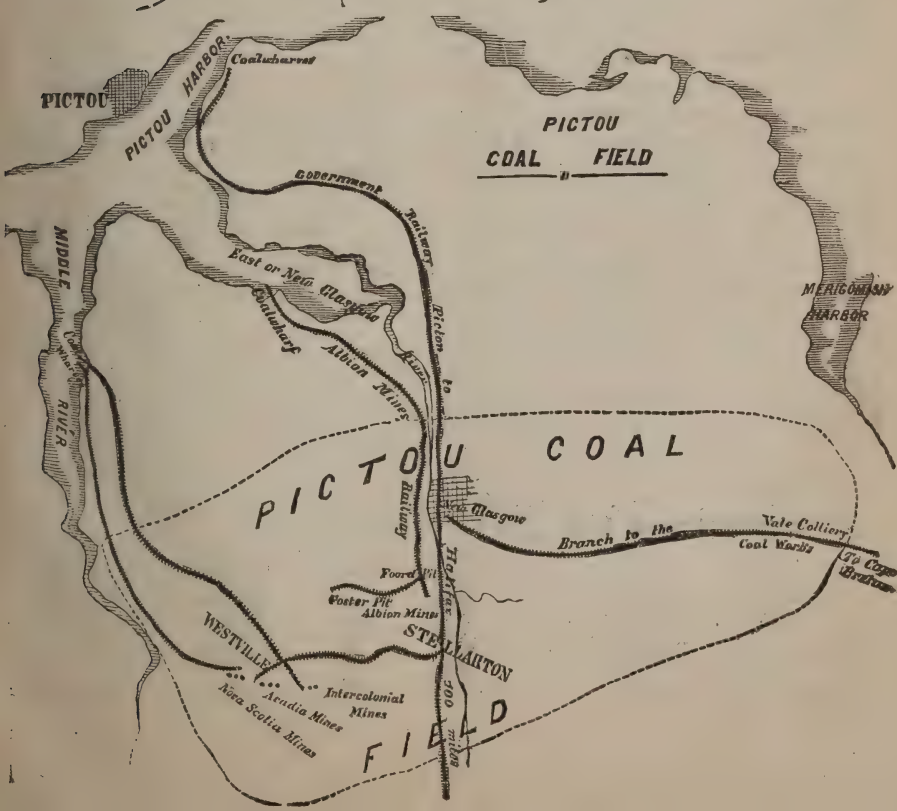
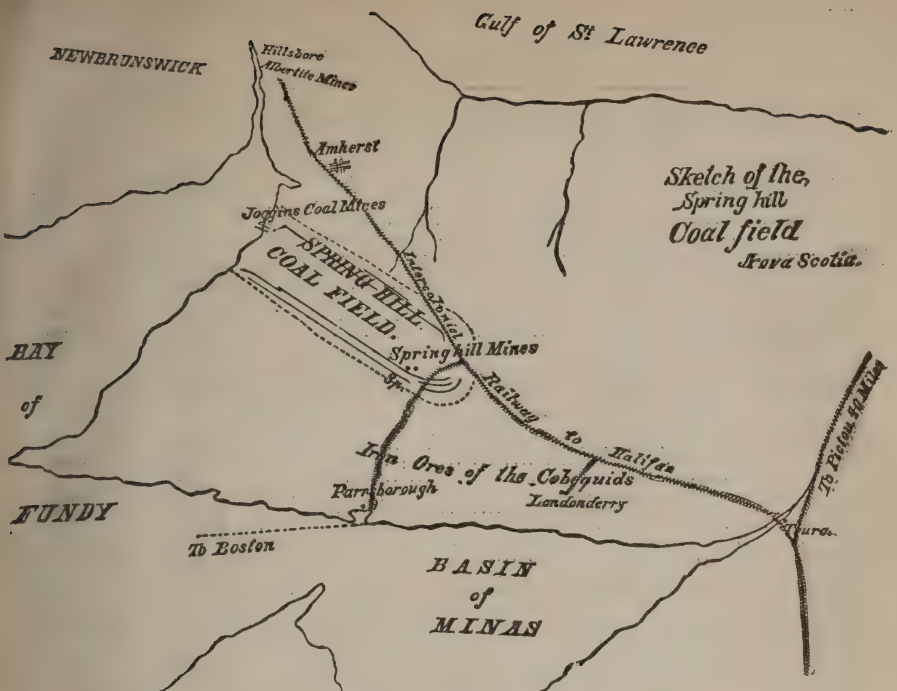
Comparing the sales of 1875 with those of the previous four years, we obtain the following table :

	1875.	1874	1873	1872
Cumberland.....	60,944	49,599	26,345	14,153
Pictou.....	337,102	357,926	333,974	389,417
Cape Breton.....	304,702	337,016	520,189	380,373
Other counties.....	4,047	4,596	588	3,070
Total tons.....	706,755	749,127	881,106	785,814

A comparison of the "markets" for each year is shown below :—

Markets.	1875—Tons.	1874—Tons.	1873—Tons.
Nova Scotia.....	212,630	214,965	215,295
Quebec.....	189,754	162,169	187,059
New Brunswick.....	85,963	78,841	68,217
Newfoundland.....	62,348	55,696	55,867
P. E. Island.....	43,641	41,943	26,840
United States.....	88,746	139,395	264,760
West Indies.....	16,429	47,844	54,213
South America.....	4,779	5,077	1,885
East Indies.....	1,003	.....	.....
Great Britain.....	497	4,152	6,976
Total.....	706,795	749,127	881,106

The most serious drawback is the small coal, one seventh of all mined being what is known as slack, frequently not finding a market at any price. In 1874, the slack was 89,446 tons, and "round coal," 659,681 tons; the introduction and use of coke ovens, will no doubt soon do away with this; already there are a number established and in operation.







## GREAT BRITAIN.

The following details of the minerals produced in Great Britain are interesting:

MINERALS.	Tons raised in 1872.	Tons raised in 1873.	Tons raised in 1874.
Coal.....	123,497,316	127,016,747	125,043,257
Iron ore.....	16,484,857	15,577,499	14,344,936
Copper ore.....	91,983	80,188	78,521
Tin ore.....	14,266	14,885	14,039
Lead ore.....	83,968	73,500	76,201
Zinc ore.....	18,543	15,969	16,830
Iron pyrites.....	65,916	58,924	56,208
Arsenic.....	5,173	5,448	6,268
Bismuth.....	2	1	.....
Cobalt.....	1	6 cwts	.....
Manganese.....	7,773	8,671	5,778
Ochre, Umber, etc.....	3,327	6,368	7,123
Wolfram.....	88	50	32
Fluor spar.....	81	.....	634
Chloride of barium.....	65	.....	.....
Barytes.....	9,093	10,269	14,374
Clays—fine and fire, and shale.....	1,200,000	1,785,000	2,436,912
Coprolites.....	35,000	.....	149,654
Salt.....	1,309,495	1,785,000	2,306,567

## METALS OBTAINED FROM THE ORES ENUMERATED.

	1872—tons.	1873—tons.	1874—tons.
Iron, pig.....	6,741,929	6,566,451	5,991,408
Tin.....	9,560	9,572	9,942
Copper.....	5,703	5,240	4,981
Lead.....	60,455	54,235	58,777
Zinc.....	5,191	4,471	4,470
Silver.....(ozs.)	628,920	537,707	509,277

Absolute total value of the metals and coal, with other minerals which are not smelted (except building stone, lime, slate, and common clay), produced in the United Kingdom:

	1872.	1873.	1874.
Value of the metals produced.....	£22,170,447	£21,409,878	£19,539,070
Value of the coal.....	46,311,143	47,629,787	45,849,194
Value of other minerals.....	1,811,826	1,681,884	2,446,049
Total.....	£70,193,416	£70,721,499	£67,834,313

The ton weight, in all cases, is 2240 pounds.

The following will show the amount of coal mined in the United Kingdom of Great Britain, as also the exports to foreign ports:

Year.	Tons Mined.	Tons Exported.	Year.	Tons Mined.	Tons Exported.
1854.....	64,600,000	4,300,000	1865.....	98,150,587	9,170,477
1855.....	61,400,000	4,900,000	1866.....	101,030,544	9,053,221
1856.....	66,600,000	5,800,000	1867.....	104,500,450	10,415,787
1857.....	65,300,000	6,600,000	1868.....	103,141,157	10,857,804
1858.....	65,000,000	6,500,000	1869.....	107,427,557	10,588,425
1859.....	71,900,000	7,000,000	1870.....	112,875,725	11,495,002
1860.....	83,200,000	7,400,000	1871.....	117,352,023	12,851,957
1861.....	85,600,000	7,200,000	1872.....	123,386,750	13,211,961
1862.....	86,600,000	7,650,000	1873.....	127,012,767	12,712,222
1863.....	88,200,000	7,500,000	1874.....	125,043,257	13,927,205
1864.....	92,787,873	8,809,908	1875.....	125,000,000	14,475,036

The following is the disposition and uses made of the coal raised during the year 1873:

Coal exported to foreign countries.....	12,712,222 tons
Coal used on railways.....	3,790,000 tons
Coal used in iron manufacture.....	35,118,709 tons
Coal used in smelting other metals.....	765,607 tons
Coal used in mines and collieries.....	9,500,000 tons
Coal used in steam navigation.....	3,600,000 tons
Coal used for steam power in manufactories.....	27,550,000 tons
Coal used in gas manufacture.....	6,500,000 tons
Coal used in water works.....	650,000 tons
Coal used in potteries, glass-works, brick, lime, cement kilns.....	3,450,000 tons
Coal used in chemical works and all other sundry manufactures.....	3,217,229 tons
Coal for domestic consumption.....	20,050,000 tons
Making the total of.....	127,012,767 tons

The production of each district for 1874 is shown in the following schedule:

Northumberland.....	6,463,550 tons.	Cheshire.....	615,105 tons
North Durham.....	6,180,000 tons.	Shropshire.....	1,187,950 tons
Cumberland.....	1,102,267 tons.	North Staffordshire.....	4,315,096 tons
South Durham.....	17,900,250 tons.	South Staffordshire.....	8,389,343 tons
Westmoreland.....	1,200 tons.	North East Lancashire.....	8,095,570 tons
Yorkshire.....	14,812,515 tons.	West Lancashire.....	7,442,950 tons
Derbyshire.....	7,150,570 tons.	Gloucester.....	1,147,272 tons
Nottinghamshire.....	3,127,750 tons.	Somerset.....	609,684 tons
Warwickshire.....	651,500 tons.	Monmouth.....	5,098,820 tons
Leicestershire.....	1,100,465 tons.	North Wales.....	2,425,300 tons
East Scotland.....	10,182,326 tons.	South Wales.....	10,182,326 tons
Ireland.....	139,213 tons.	West Scotland.....	6,606,335 tons

Total of the United Kingdom 125,067,916 tons.

The Board of Trade returns show the following shipments, from Great Britain to foreign ports, in the years named:

COUNTRIES,	1874.	1875.
Russia.....	883,765	884,861
Sweden and Norway.....	720,607	1,139,273
Denmark.....	662,280	760,719
Germany.....	2,057,029	2,154,367
Holland.....	447,621	455,201
France.....	2,370,661	2,709,494
Spain and Canaries.....	581,613	690,762
Italy.....	966,188	954,694
Turkey.....	311,091	241,918
Egypt.....	638,276	532,376
Brazil.....	386,357	365,172
Malta.....	313,022	228,081
British India.....	659,986	608,257
Other countries.....	2,726,850	2,753,859
Total.....	13,927,205	14,475,086
Coal for Steamers engaged in foreign trade.....	3,140,883	3,278,249

The receipts of coal at London for a series of years have been as below

Year.	By Sea.	By Canal.	By Rail.	Total.
1865.....	3,161,683	8,532	2,733,056	5,903,271
1866.....	3,033,193	10,176	2,969,896	6,013,265
1867.....	3,016,416	9,965	3,295,652	6,322,033
1868.....	2,918,230	9,527	2,979,333	5,907,089
1869.....	2,873,688	6,941	3,341,585	6,212,214
1870.....	2,993,710	7,301	3,758,089	6,759,100
1871.....	2,762,712	6,615	4,449,141	7,218,468
1872.....	3,548,918	8,236	4,999,268	7,556,422
1873.....	2,665,630	11,195	5,147,413	7,824,238
1874.....	2,727,719	5,982	4,689,785	7,423,486

## NEW SOUTH WALES.

The most extensively worked of the coal measures are those of Hunter River (or Newcastle,) located on the southern and western sides of the river, and include Cannel and Splint coal, and kerosene shale.

About forty miles south of Sydney commences what is known as the "Vollongong" coal measure. Outcrops have been traced for thirty miles to the southward, while inland its extent is undetermined. The seam runs from six to eight, and in one part fourteen, feet in thickness.

To the west of Sydney there is what are known as the Hartley coal measures, producing a non-caking coal, approaching a Splint and from nine to eleven feet in thickness. Communication with these mines is had by railway to Sydney. In connection with this district we may mention the Cannel coal of Petrolea Vale, a long valley running down on the northern side of Mount York. The seam is six feet in thickness, eight inches on the top and four inches at the bottom being common kerosene shale, while the remaining five feet consist of fine Cannel coal, giving an average of 150 gallons of crude oil to the ton. The seam is worked by an adit on the outcrop.

The specific gravity of the oil made from this shale is 804 at 60 degrees Fahrenheit. The "flashing point" ranges from 118 degrees to 126 degrees Fahrenheit.

W. B. Clarke, M. A., in his report on the sedimentary deposits of New South Wales, embodied in the government reports, speaks of the geological position of the shales thus :

"Recent researches have satisfied me that these only belong to the upper coal measures.

"It has unquestionably resulted from the local deposition of some resinous wood, and passes generally into ordinary coal.

"There is no anomaly in finding in one spot a mere patch in a coal seam at Anvil Creek, on the Hunter River ; or thick bedded masses, as in the coal seams of Mount York, the thickness depending on the original amount of drift timber."

W. Keene, F. G. S., government examiner of coal fields, says :

"The lower beds of the coal series of New South Wales are geologically older than any worked in Europe, while the upper beds represent the most recent of the European true carboniferous formation.

"I have examined seams more than seven hundred miles to the north of Newcastle, belonging to the same deposits we are working here (Newcastle) and we may, without boasting, claim to rank with the most extensive coal fields in the world."

It is stated that although the kerosene shale has only been worked at



Hartley and Wollongong, it may possibly be found in connection with any of the different coal seams, and as these spread over an enormous area of country, it is impossible to place any limits on the quantity of this peculiar mineral that the colony may possess.

There were twenty-eight collieries raising coal, and three getting petroleum oil, cannel coal, and shale, and the aggregate production of coal from these collieries, in 1874, was 1,298,400 tons valued at £786,152 17s.

The aggregate production of petroleum oil, cannel coal, and petroleum oil shale in 1874 was 12,100 tons, valued at £27,300.

The following is a return of the number of coal mines, and quantity and value of coal raised from the years 1864 to 1874, inclusive.

Year.	No.	Quantity.	Value.		
		Tons—2240 lbs.	£	s.	d.
1864.....	25	549,012½	270,171	11	0
1865.....	24	585,525½	273,303	13	9
1866.....	25	774,238	324,049	6	7
1867.....	26	770,012½	342,655	7	8
1868.....	28	954,230½	417,809	6	1
1869.....	33	919,773½	346,145	16	5
1870.....	32	668,564½	316,835	16	4
1871.....	27	898,784½	316,340	2	1
1872.....	26	1,012,426½	396,197	19	10
1873.....	29	1,092,861½	665,746	17	3
1874.....	28	1,298,400	786,152	17	0

From these returns the Government Examiner finds that the coal trade of New South Wales is, year by year, increasing in a most satisfactory manner, and has never been in such a prosperous condition as it is at the present time. Many new companies have been formed, as well as very large areas of coal land taken up in various parts of the colony with the intention of working the coal from under it. If this rapidly increased demand for coal could have been foreseen a few years ago and the shipping facilities at Newcastle had been greater than they now are, they would have had a much larger production and demand to report, and when the extra wharves and cranes now in course of erection at the Newcastle Harbor are completed there will be a much larger foreign demand for New South Wales coal. The agreement entered into by the associated masters and the officers and delegates of the Coal Miners' Association of the Hunter River District, by which the wages paid for hewing coal and other work usually done by the miners, the hours of labor to be observed at the different collieries, and the mode of settling any disputes that may arise in reference thereto, are to be arranged, is stated to be working well, and no doubt is entertained that it has been the means of keeping the price of coal at 14s. per ton, delivered into vessels in Newcastle Harbor.

The following detailed returns for the year 1874, are of interest in this connection, as they give the business of each district;

## NEWCASTLE DISTRICT.

Bituminous coal, used for steam, household, smelting, gas, blacksmith, and coking purposes.

Newcastle Wallsend Colliery.....	240,000 tons.
Australian Agricultural Company.....	195,494 tons.
Co-operative Colliery.....	149,699 tons.
Waratah Colliery.....	181,279 tons.
New Lambton Colliery.....	183,805 tons.
Lambton Colliery.....	127,768 tons.
Dunkenfield Colliery.....	8,821 tons.
Victoria Tunnel.....	2,148 tons.
Glen Rock Colliery.....	1,400 tons.

Total quantity in 1874.....1,035,403 tons.

*Four-mile Creek and Branxton, &c., in the Northern District.*—Splint and Bituminous coals, suitable for steam, household, gas, smelting, blacksmith, and coking purposes:

Pease & Co., Four-mile Creek.....	11,088 tons.
Ingaree Colliery.....	5,858 tons.
Sunderland.....	1,200 tons.
Bloomfield.....	757 tons.
Dark Creek.....	150 tons.
Greta Coal and Shale Company.....	29,030 tons.
Anvil Creek Colliery Company.....	24,000 tons.
Rix's Creek, near Singleton.....	180 tons.
Stony Creek, near Maitland.....	500 tons.

Total quantity in 1874.....72,763 tons.

## WESTERN DISTRICT.

*Lithgow Valley, Hartley, and Mudgee Road.*—Splint coal used for household, steam, smelting, gas, blacksmith, and coking purposes,

Lithgow Valley Colliery.....	18,000 tons.
Thos. Brown, Esq., M. L. A., Eskbank Colliery.....	8,690 tons.
Bowenfels Colliery Company.....	8,500 tons.
Vale of Clywdd Company.....	50 tons.
Bulkeley's Coal Mine at Blackman's Flat, Mudgee Road.....	50 tons.

Total quantity in 1874.....35,200 tons.

	Tons.	Value.
New South Wales Shale and Oil Company—petroleum oil, cannel, coal, used for oil and sold for gas purposes, 1874.....	9,000	£22,500

## SOUTHERN OR ILLAWARRA DISTRICT.

Semi-bituminous coal, used for steam, household, smelting and blacksmith purposes.

	Tons.	Value.
Bullai Colliery.....	58,500	£29,253
Mount Pleasant Colliery.....	38,985	16,568
Osborn Wallsend Colliery.....	37,796	16,063
American Creek (used for oil making).....	1,000	500

Total quantity and value in 1874.....136,287 £6,384

Total quantity and value in 1873.....137,062 £62,839

Decrease in 1874.....775 £505

American Creek petroleum oil shale made into oil at the works.....3,000 £4,500

## A U S T R I A .

Austria contains such large deposits of coal wealth, that naturally she may be regarded as one of the richest coal-producing nations of Europe. Silesia, Galicia, and Bohemia are said to contain deposits of coal sufficient to supply the whole consumption of Europe for several centuries ; but this we fear, is rather tall talk, although the coal wealth of the districts named is doubtless very considerable. It is only recently that this has been turned to profitable account. In 1818 the produce of coal in Austria and Hungary was 84,450 tons ; in 1828 it was 153,950 tons ; and in 1838, 299,100 tons. The progress made in the twenty years was not very marked, but it has since been greatly accelerated, the production having risen in 1848 to 838,000 tons ; in 1858 to 2,598,800 tons. Below will be found the details from the year 1860 up to the present time.

Years.	Pit coal.	Lignite, &c.
1860 .....	1,739,455	1,389,023
1861 .....	2,023,323	1,604,339
1862 .....	2,252,951	1,811,767
1863 .....	2,278,343	1,803,477
1864 .....	2,205,540	1,896,153
1865 .....	2,532,933	1,199,483
1866 .....	2,416,783	1,952,799
1867 .....	2,967,963	2,477,423
1868 .....	3,334,065	2,864,962
1869 .....	3,493,209	3,191,952
1870 .....	3,483,250	2,930,325
1871 .....	4,892,481	4,998,869
1872 .....	4,713,280	5,676,672
1873 .....	5,000,000	6,000,000

The consumption of coal during the years named has been as follows :

Years.	Tons.	Years.	Tons.
1866 .....	4,699,737	1870 .....	8,337,867
1867 .....	4,707,804	1871 .....	10,365,509
1868 .....	6,799,899	1872 .....	10,861,575
1869 .....	7,529,163	1873 .....	11,500,000
	1874 .....		12,000,000

## R U S S I A .

The chief centres of the Russian coal supply are as follows: In the south, the basin of the Lower Don, which contains 15,000 square miles of the finest Anthracite ; in the west, the governments of Kiev and Kharkoff ; and further to the north, the great central or Moscow basins, comprising the governments of Tver, Kalouga, Moscow, Raizan, Tula and Novgorod, extending northward as far as the Dwina. To these items may be added those of the Kharkoff and Ekaterinoslay beds of Anthracite, and private coal fields of the "Privis linski Krai," the districts lying to the east of the Vistula. The total area of the coal fields of the Empire of Russia is put at 30,000 square miles.



**BELGIUM.**

The production of coal in Belgium, and the exportations since 1836 may be observed from the following table :

Years.	Production. Tons.	Exportation. Tons.
1836 .....	2,056,464	773,612
1846 .....	5,037,403	1,355,833
1856 .....	8,212,419	2,866,137
1866 .....	12,774,662	3,977,702
1867 .....	12,755,822	4,300,364
1868 .....	12,298,589	3,764,502
1869 .....	12,926,894	3,592,790
1870 .....	13,697,118	3,182,150
1871 .....	13,733,175	3,186,204
1872 .....	15,653,948	4,608,100
1873 .....	15,778,401	4,157,903
1874 .....	14,669,029	3,886,366

The Belgian ton is 1000 kilogrammes=2,200 pounds English.

The output is furnished by the different basins in the following proportions :

Basins.	Per cent.	Basins.	Per cent.
Mons.....	27.2	Liege.....	23.3
Charleroi.....	27.1	Namur.....	2.5
Centre.....	18.9		

The Province of Hainant is the largest coal producer, furnishing 10,698,130 tons during the year 1875. The consumption of coal in Belgium is about two tons per annum to each inhabitant. The imports of coal, mainly from England, amount to a half a million tons only, being 458,282 tons for the year 1874.

**FRANCE.**

There are fifty-nine small coal basins in France, but the most important are those of the Loire and St. Etienne, which are the best known, and comprise about 50,000 acres.

Probably one million tons of what is known as Anthracite, and the same quantity of soft Anthracite, are annually produced in France, the balance being Bituminous coal.

The production of coal in France, since 1787, has been as follows (tons of 2200 pounds, or ten metric quintals):

1787.....	211,160	1836.....	2,789,858	1868.....	13,253,876
1802.....	829,105	1841.....	3,349,303	1869.....	13,188,662
1811.....	759,878	1846.....	4,389,532	1870.....	6,550,000
1816.....	924,823	1852.....	4,816,306	1871.....	13,400,000
1821.....	1,114,448	1857.....	7,755,987	1872.....	15,599,005
1826.....	1,513,482	1862.....	10,102,116	1873.....	17,500,000
1831.....	1,728,950	1867.....	12,143,223	1874.....	17,000,000

In 1874 the Loire is set down for 3,821,200 tons ; the Nord for 3,071,972 tons, and the Pas-de-Calais 2,978,600 tons.

## THE COAL TRADE.

France takes annually two and a half million tons of British coal, the figures for 1875 being 2,558,678 tons.

Regarding the production and consumption of coal in France, the following may be of interest:

Years.	Production.	Consumption.
1869 .....	13,100,100	19,424,728
1870 .....	13,300,000	16,859,034
1871 .....	13,000,000	18,512,246
1872 .....	15,900,000	21,993,362
1873 .....	17,500,000	22,700,000

The difference between product and consumption represents coal imported from Belgium and Great Britain.

## THE GERMAN EMPIRE.

As now consolidated, Germany ranks as the largest producer of coal in Europe, and the third in the world.

The production of coal and Brown coal in Prussia for a series of years previous to the year 1871, has been as follows:

1837.....	1,950,915	1864.....	19,408,982
1857.....	9,841,229	1865.....	21,794,705
1858.....	10,721,323	1866.....	21,629,746
1860.....	12,347,828	1867.....	23,793,327
1861.....	14,133,048	1868.....	25,704,758
1862.....	15,576,278	1869.....	26,774,368
1863.....	16,906,707	1870.....	23,316,238

Since 1870, the Empire includes old Prussia, Saxony, Bavaria, and the States of the Zollverien.

The product of coal of all kinds in the whole of the German States was as follows:

Year.	Hard coal. Tons.	Brown coal. Tons.
1870 .....	26,397,769	7,605,234
1871 .....	29,373,272	8,482,837
1872 .....	33,306,419	9,018,048
1873 .....	36,892,279	9,252,914

The output of old Prussia is alone to be had for the year 1874; we give some interesting figures, also a comparison with 1873. There was produced in the former year 31,938,683 tons of hard coal, and 8,716,649 tons of soft or brown coal. There were 1050 mines working, at which 180,147 men were employed, supporting 307,295 persons. During 1873, 1003 mines were opened, employing 174,440 men, supporting 299,463 persons, and 32,347,409 tons of hard coal, and 7,987,333 tons of Brown coal were produced.

We have returns for the Dortmund district, which produces nearly one-half of the hard coal of the Empire, for 1875—16,805,947 tons of coal were produced, (being an increase of  $9\frac{1}{2}$  per cent. over product of 1874;) employ-

ing 82,605 men, in 259 collieries ; the value in 1875 was one-third less than in the previous year. The import and export business of the Empire was as follows :

1874—Imported.....	1,808,144 tons coal.	Exported.....	4,239,525 tons coal.
“ “ .....	306,432 tons coke.	“ .....	166,035 tons coke.
1873—Imported.....	1,456,497 tons coal.	Exported.....	4,010,406 tons coal.
“ “ .....	548,553 tons coke.	“ .....	42,453 tons coke.

The value of the imports in 1873 was eighteen million thalers, while the exports were valued at thirty-three million thalers.

It is usual to count twenty German centners as one ton, and as they are 113.38 pounds English, the tons mentioned above are 2,267 pounds, or 27 pounds more than our gross tons.



## WEST VIRGINIA.

The coal measures of West Virginia underlay nearly sixteen thousand square miles of territory, of which, what is known is the Kanawha and New River Valleys hold eight thousand. Three varieties of coal occur: cannel, splint, and bituminous. Of the bituminous there are seams of different degrees of hardness and texture, from the friable coking coal, similar to the best of the Newcastle (England) coals, to the harder splint coals, with regular cleavage, similar to the Youghiogheny coals so largely in demand in our Western and Southern cities; of so compact a nature that it can be used in an iron blast furnace in its raw state.

The bituminous coals are excellent steam raising fuels, and have been used in steamers, railways, and under stationary engines with good results. The gas coal seam is identical with the Kittanning coal bed, mined on the Allegheny river, in Pennsylvania, and has been used in the eastern and western markets with most satisfactory results.

On approaching from the eastward, the bituminous coal seams of West Virginia are first found in the tops of the mountain ranges overlooking New river, in Summers and Raleigh counties, embracing only the lowest seams of what are known as the lower coal measures. The Big Sewell mountain a prominent elevation in West Virginia, towering some 2,800 feet above sea level, and 1,500 feet above New river, forms the south eastern edge of the "Upper Ohio coal basin." All the territory drained by the Kanawha and its tributaries, between the Falls of the Kanawha and Campbell's creek, contains the seams of coal within workable reach, above water level, or by shafts at no great depth. It can be mined very cheaply; and the quantity available is vast beyond conception. The top seam of the lower coal measures disappears beneath the Kanawha, at its confluence with the Elk river, at Charleston; while some of the coal seams reappear up the valleys formed by the Elk and Coal Rivers. Cabin creek, Elk river, and Coal river are three considerable tributaries to the Kanawha, penetrating the country for long distances, and bringing into convenient working position thousands of acres of valuable coal land.

At Quinnimont, on the line of the Chesapeake and Ohio Railroad, 295 miles west of Richmond, are the works of the New River Car Co. Analysis made by J. B. Britton, gave the following results:

Coal.		Coke run of mines.	Coke from slack.
Fixed Carbon.....	75.69	Carbon.....	93.85
Volatile Matter.....	13.19	Ash.....	5.84
Ash.....	4.93	Sulphur.....	0.31
Moisture.....	0.74	Water.....	—
			2.71

This company is mining a vein about  $3\frac{1}{2}$  feet bituminous coal, using the

the coke in their blast furnace, for the manufacture of car wheels. The coke is fully equal to the famous Connellsville, of Pennsylvania.

At Nuttallburg, 316 miles west from Richmond, John Nuttall, Esq., is mining a Bituminous coal from the lower coal measures; the vein is  $3\frac{1}{2}$  feet thick far above water level. The coal finds a market east for steam purposes. The Old Dominion Steamship Co., has been using this coal with satisfaction. The slack coal is made into coke, for the manufacture of which he is now erecting ovens. The coke has been used for iron smelting and for foundries with great success, being pronounced by those who have tried it, equal to the best Connellsville coke.

At Hawk's Nest, 325 miles west from Richmond, are the works of the Gauley-Kanawha Co., an English concern. Their coal was analyzed at the School of Mines, in London, with the following result: Carbon, 83.31; hydrogen, 5.54; oxygen and nitrogen, 6.86; sulphur, 0.74; ash, 2.15; water, 1.40.

At Cannelton, 344 miles west from Richmond, the Cannelton company are working the coal, which is so well known in the eastern and western markets. At this point there are the following seams of coal: The first, known as the "Smithers Creek," 4 feet 9 inches in thickness (two benches of coal separated by four inches of slate.) Next above is the gas coal, of 6 feet 8 inches, made up of three benches; the coal is a first class gas coal. Above this is a seam of coal 5 feet in thickness, of semi-bituminous quality. Above this is the "Stockton" seam of coal, 5 feet 4 inches in thickness, averaging  $3\frac{1}{2}$  feet of cannel, and 1 foot 10 inches of splint coal. Next above is a seam of "Splint" coal, 8 feet in thickness, 6 feet of which is a solid mass, and an excellent coal for smelting purposes. We give an analysis of the Cannelton, made by the Manhattan Gas Light Co., of New York: Volatile matter, 58.0; fixed carbon, 23.5; ash, 18.5. At standard (10,000 cubic feet) it gave an illuminating power of 64.54 candles, or 12,025 cubic feet of 45.60 candles. Weight of 32 bushels of coke, 1320 pounds.

In the vicinity of Coalburg (Brownstown) 354 miles west from Richmond, are several operations, working coal which is highly appreciated by iron-masters as an excellent fuel, in its raw state, in the reduction of iron ores, and also for steam and domestic purposes in the Ohio river markets. Analyses made of the bituminous coal from this locality show: Fixed carbon, 56.0 to 62.6; volatile matter, 40.5 to 33.3; ash, 1.5 to 1.8; water, 2.0 to 2.5.

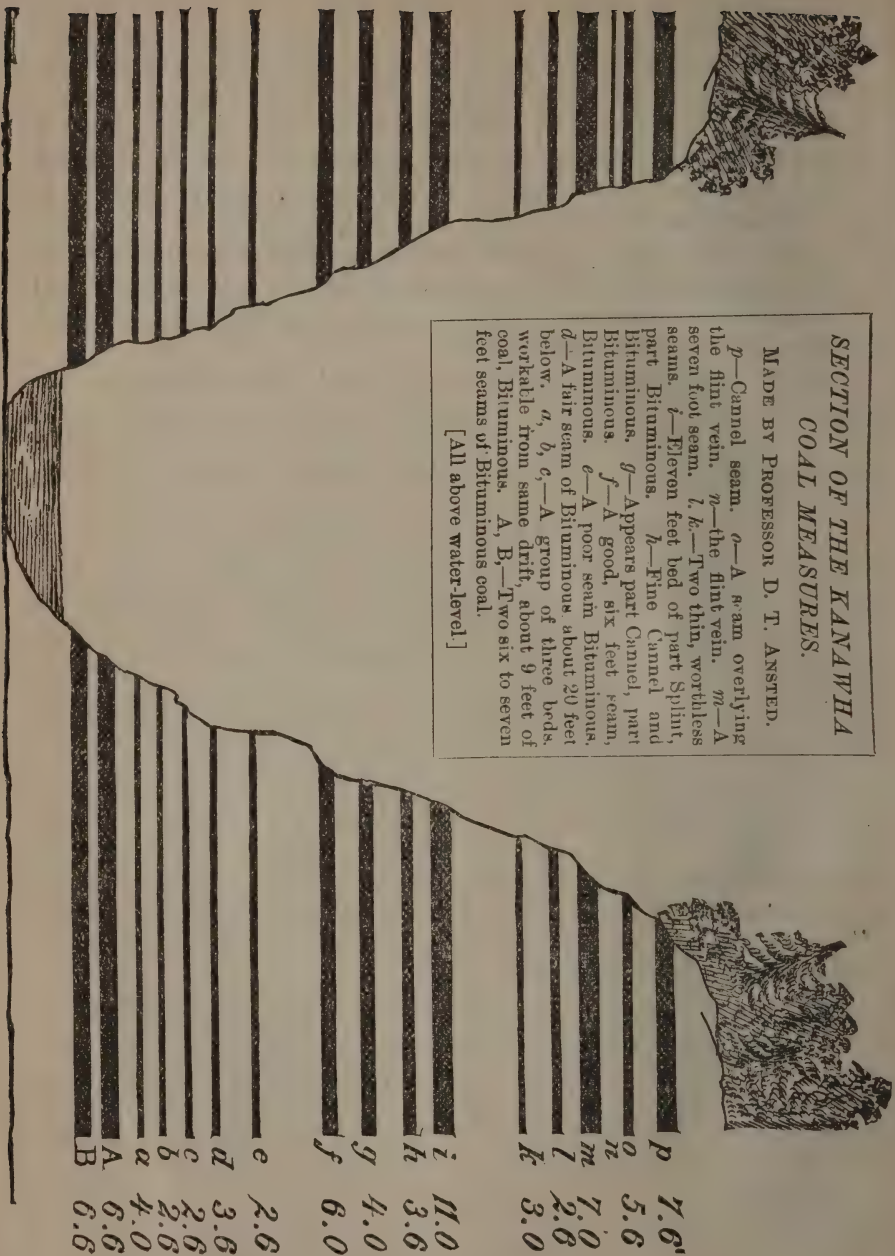
At Peytona, in Boone county, are the mines of the Peytona Cannel Coal Co., located on Coal river, about thirty-five miles from its junction with the Great Kanawha river, 380 miles west from Richmond. The coal is transported by slackwater navigation to the mouth of Coal river, where a connection is made with the C. & O. R. R. The great part of the product of

# SECTION OF THE KANAWHA COAL MEASURES.

MADE BY PROFESSOR D. T. ANSTED.

*p*—Cannel seam. *o*—A seam overlying the flint vein. *n*—the flint vein. *m*—A seven foot seam. *l, k*.—Two thin, worthless seams. *i*—Eleven feet bed of part Splint, part Bituminous. *h*.—Fine Cannel and Bituminous. *g*.—Appears part Cannel, part Bituminous. *f*.—A good, six feet seam, Bituminous. *e*.—A poor seam Bituminous. *d*.—A fair seam of Bituminous about 20 feet below. *a, b, c*.—A group of three beds, workable from same drift, about 9 feet of coal, Bituminous. A, B.—Two six to seven feet seams of Bituminous coal.

[All above water-level]





The mines has been forwarded westward by the Kanawha and Ohio rivers to Cincinnati, and other important places bordering the rivers. The coal is also sold in the Eastern markets, where it is esteemed both for gas purposes and fuel. We give place to an analysis of this coal made by the Manhattan Company. Volatile matter, 46.0; fixed carbon, 44.0; ash, 13.0. At 10,000 feet per ton, standard yield, the illuminating power is 43.12 candles, or 13,200 cubic feet of 32.66 candles. Weight of coke, 32 bushels=1380 pounds.

In regard to an outlet from this region, we have the Chesapeake and Ohio Railway eastward, the building of which has done so much to open up this district. Their charges for carrying coal are extremely liberal, when we consider that it is comparatively a new road, and has many obstacles to surmount from errors in the original location of the line; a more decided move seems to have been inaugurated this year, looking to the development of the coal trade, and in time it is destined to carry considerable quantities of coal.

The Government improvements of the navigation of the Kanawha river, by dams and locks, will tend to develop the resources of this most wonderful region, and, in a few years, it will not be surprising to find this the iron making district of America.

The total coal product of West Virginia may safely be estimated at 600,000 tons per annum.

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## MISSOURI.

[From the report of G. C. Brodhead, State Geologist for 1874.]

The coal measures of Missouri comprise an area of about 22,995 square miles, including 160 square miles in St. Louis county, 80 in St. Charles, and a few outliers in Lincoln and Warren; the remainder in northwest and western Missouri. This includes 8,406 square miles of upper or barren measures, about 2,000 square miles of exposed middle, and 12,420 of lower measures.

The boundary between the middle and lower coal is not well defined, but is limited by a thick-bedded, coarse, micaceous sandstone, sometimes of no great extent, at other times of great thickness. We suppose it to enter the State in the west part of Bates county, and to pass thence via Butler to Chilhomee in Johnson county; thence northwardly four miles west of Warrensburgh to four miles east of (?) Aullville, Lafayette county; thence, irregularly meandering through Lafayette county, crossing the Missouri river, passing to ten miles east of Carrollton, Carroll county; thence to the southeast corner of Livingston county, from which point it bears northeast to the center of Linn county, and thence, northward. The southern

and eastern boundary of the lower coal measures is as follows: (through Barton, Bates, Vernon and St. Clair, the boundary has not yet been well defined;) entering the State in Barton, it passes northeast through the eastern part of Vernon; it enters St. Clair about one half way up, on its western line, thence, meanders eastward to a point a few miles north of Osceola; thence, northward to within eight miles of Clinton, Henry county, thence northeast to the east line of Henry county; thence northwardly, with occasional variations of sandstones as much as eight miles east to Brownsville, Saline county; thence north-eastward to Marshall and thence to Miami. On the north side of the river it passes eastward, from a point opposite Arrow Rock, to the east line of Howard county; and thence, in a meandering course via Columbia, Boone county, New Bloomfield and Fulton, Callaway county, to the northeast corner of Callaway; thence, north-eastwardly to a point three miles west of the northeast corner of Montgomery county; thence northwest to near the mouth of Lick creek, Ralls county: thence, southwest to Mexico, Audrain county; from thence, to the northwest corner of Monroe county, thence, irregularly trending northward to the northwest corner of Knox county; thence, to a point on the north line of Lewis county, about 12 miles west of the Mississippi river; thence northwardly to the Des Moines river, on the north line of the State of Missouri. East of this, are small outliers in Montgomery, Warren, Lincoln and St. Louis counties, and perhaps others in southwest Missouri.

The aggregate thickness of the upper coal measures is 1,317 feet, including only about 4 feet of coal, of which there are two seams of one foot in thickness; the others are very thin seams or mere streaks. The middle coal measures include a total thickness of about 324 feet, in which are embraced about 7 feet of coal, including two workable seams of 21 and 24 inches; one other of one foot, that is worked under favorable circumstances, and six seams too thin to work. The lower measures include from 250 to 300 feet, embracing about five workable seams of coal, varying in thickness from  $1\frac{1}{2}$  to  $4\frac{1}{2}$  feet, and thin seams varying from 6 to 11 inches, and several minor seams and streaks; in all 13 feet 6 inches of coal. We therefore have in Missouri nearly 1,900 feet of coal measures with a total aggregate of 24 feet 6 inches of coal. The thinner seams of coal are not often mined, except in localities remote from railroad transportation. The coal from thicker seams (those from  $1\frac{1}{2}$  to 2 and 4 feet) is generally sold at 10 cents per bushel at the mines. The thin seam, 10 to 14 inches on Nodaway river, is sold at over 20 cents per bushel at the mines. The reason of this is the difficulty of mining (there being so much superfluous material to be removed) and the remoteness of other coals. Miners seem to prefer to work a bed of 2 to  $2\frac{1}{2}$  feet in thickness. We would consider all beds over

18 inches thick as workable coals. The estimated area, where such may be reached within 200 feet from the surface, is about 7,000 square miles. The coal is bituminous, and the product may be safely estimated at 800,000 tons.

The following is a condensed vertical section of the coal measures:

No.	Locality.
1—339 feet, including 230 feet above the connected section.....	
2—12 inches coal.....	Holt, west part of Nodaway and northwardly; also White Cloud, Kansas.
3—392 feet.....	
4—12 inches coal.....	Andrew, Buchanan, De Kalk, Gentry and Platte
5—267 feet.....	
6—10 inches coal.....	Platte county.
7—379 feet to base of upper coal measures.....	
8—3 inches coal at top of middle coal measures....	Pleasant Hill, Missouri City and Princeton Mercer County.
9—164 feet.....	
10—1 foot coal.....	Cass, Johnson, Lafayette and Livingston, also Grundy.
11—70 feet.....	
12—22 feet (Lexington coal).....	Lafayette, Johnson and Ray.
13—36 feet.....	
14—7 inches coal.....	Lafayette and Ray.
15—14 feet.....	
16—21 inches coal.....	Lafayette, Johnson, Carroll and Livingston.
17—5½ to 99 feet.....	
18—1½ feet (Warrensburgh coal). ....	Johnson, Henry and Charitan.
19—52 feet.....	
20—7 inches coal.....	Johnson.
21—18 feet.....	
22—1 foot 8 inches coal.....	Johnson.
23—18 feet.....	
24—8 inches coal.....	Johnson.
25—4 feet.....	
26—2 feet coal.....	Henry.
27—48 feet.....	
28—2½ feet to 4 feet 5 inches coal.....	Randolph, Boone, Callaway, Johnson, Henry, Vernon, Bates, Adair, Sullivan, Putnam, Audrain and Macon.
29—11 feet.....	Macon.
30—11 inches coal.....	Macon, Henry and Johnson.
31—About 13 feet.....	
32—2 feet coal; 10 inches of clay near base.....	Ralls, Audrain, St. Louis, St. Charles and Montgomery, Henry and Johnson.

## OHIO.

The coal measures within this State occupy a space of about 180 miles in length by 80 in breadth at the widest part, with an area of about 10,000 square miles, extending along the Ohio river from Trumbull county, on the north, to near the mouth of the Scioto, on the south. The counties wholly underlain with coal are Mahoning, Columbiana, Stark, Holmes, Tuscarawas, Carroll, Jefferson, Harrison, Belmont, Guernsey, Coshocton, Muskingum,



Perry, Noble, Morgan, Monroe, Washington, Athens, Miegs, Galla, Lawrence, and nearly all of Jackson. The counties of which the eastern or southeastern parts only are underlain with coal are Trumbull, Summit, Medina, Wayne, Licking, Fairfield, Hocking, Vinton, and Scioto. There are small detached basins in Wayne, Ashland, Richland, and Knox counties. The boundary on the east is the State line, the same field extending eastward over all western Pennsylvania.

Prof. J. S. Newberry, divides the coals of Ohio into three classes—first, the dry, open-burning or furnace coals; second, cementing or coking coals; third, cannel coals, the first, which is popularly known as block coal, includes those that do not coke and adhere in the furnace, and are such as may be used in the raw state for the manufacture of iron. The second, embracing by far the greater portion, are of the ordinary coking, bituminous kinds, which to a greater or less degree melt and agglutinate by heat. The third variety consists of the cannel coals, which resemble a dark shale, highly impregnated with bitumen, and burns with a bright flame, but does not agglutinate.

The chief mining regions of Ohio are the Mahoning Valley, the Tuscarawas Valley, the Hocking Valley, including the Straitsville and Shawnee mines, the Salineville region, the Pomeroy region, the Bellaire region, the Steubenville region, the Jackson region, the Cambridge region, the Coshocton region, the Leetonia region, and the Ironton region.

The mines of Mahoning Valley, the Tuscarawas Valley, and the Jackson region are all opened on the lower coal of the measures, called Briar Hill coal, Block coal, furnace coal, etc. It is usually about four feet thick. The mines of Hocking region, Steubenville, part of Salineville, Cambridge, are opened on No. 6, which ranges from 4 to 13 feet of thickness and is open burning in quality also. The others are worked in each of the different beds, of which there are ten altogether of minable thickness.

The chemical analysis of the Ohio coals shows that the relative amount of moisture varies from 1.10 per cent. to something over 9.10 per cent. The amount of volatile matter varies from 28 per cent to something over 40 per cent. Fixed carbon varied from 34.10 (in the upper coal from Holmes county) to 65.90 (in the coal from Steubenville shaft.) The ash found in eleven Ohio cannel coals was 12.827 per cent. The average proportion of sulphur was 1.551 per cent, that from the lower half of the State being 1.229 per cent. and that of the coal from the upper half 1.836 per cent.

Coal was discovered in Tallmadge, a mile west of the Centre, as early as 1810. It was visible in a small ravine, where for many years blacksmiths from the adjacent country came and dug it from an open pit. At that time no other coal was known in Northern Ohio. As early as 1755, mineral coal

It has been discovered near Bolivar, in Tuscarawas county, by its being seen on fire, but it was not dug or mined for use as fuel, in this part of the State, prior to 1810. The seam was 4 feet thick, and was regularly mined in 1820. The Perry county coal field is new, dating back only to 1870; yet the seven mines at Straitsville take out as much coal daily, as the whole of Hickory township combined. This coal is of about the same character as the block coal of Mercer, Trumbull, Mahoning and other adjoining counties, is 11 feet thick, although there are two other veins, one under and one above the "great vein," aggregating another 11 feet, making in all 22 feet of coal in three veins, in the same hill, all above the water level.

Cleveland and Erie have hitherto had a monopoly of the trade by lake, but it will soon embrace several other lake towns. Toledo, Sandusky, Black River, Fairport, and Ashtabula have roads leading to the mines, the principal object of which is to bring out coal.

An analysis of the block coals of the Mahoning Valley gave the following results:

	I.	II.	III.
Specific Gravity.....	1.281	1.260	1.323
Water.....	3.60	2.47	3.90
Volatile Matter.....	31.58	31.83	29.70
Fixed Carbon.....	62.66	64.25	60.40
Ash.....	1.16	1.45	6.60
	100.—	100.—	100.—

No. 1—Sample of Briar Hill, from Chestnut Ridge.

No. 2—From Vratich's mine, Youngstown.

No. 3—From Walworth's mine, Mahoning County.

Mr. Andrew Roy, State Inspector of Mines, gives the production of coal in this State as below:

1872.....	5,315,294 tons.	1874.....	3,267,553 tons.
1873.....	5,450,028 tons.	1875.....	4,868,259 tons.

The number of persons employed in coal mining in this State in 1875 was 2,096 underground, and 1,373 on the surface. The business of that year was furnished by the various counties to the following extent:

County.	Production.	County.	Production.
Athens.....	329,503 tons.	Muskingum.....	109,480 tons.
Belmont.....	213,505 tons.	Mahoning.....	271,689 tons.
Carroll.....	60,000 tons.	Meigs.....	345,500 tons.
Columbia.....	332,446 tons.	Noble.....	4,000 tons.
Coshocton.....	90,669 tons.	Perry.....	503,169 tons.
Guernsey.....	133,427 tons.	Stark.....	408,180 tons.
Gallia.....	5,420 tons.	Tuscarawas.....	107,000 tons.
Hocking.....	170,030 tons.	Summit.....	274,876 tons.
Holmes.....	14,000 tons.	Trumbull.....	749,059 tons.
Harrison.....	5,300 tons.	Vinton.....	56,356 tons.
Jefferson.....	195,265 tons.	Wayne.....	50,291 tons.
Lawrence.....	122,481 tons.	Washington.....	12,425 tons.
Medina.....	80,003 tons.	Small mines.....	80,000 tons.

## ARKANSAS.

The coal field of Arkansas has an area of 12,000 square miles, in twelve counties. The coal found is semi-bituminous or semi-anthracite. A bed of semi-bituminous coal nine feet thick is reported in Sebastian County. The Spadra semi-anthracite is the only coal that is known in market to any extent, and an account of its location, etc., will prove interesting. "This name is given to a deposit of semi-anthracite coal, three feet thick, found at Spadra, in Johnson County, 105 miles from Little Rock, now being worked by the Spadra Coal and Iron Company. It lies almost horizontal, with a slight dip to the north. It crops out on the river bank, and is traceable along the river front. On digging anywhere, the same vein, from  $3\frac{1}{2}$  to 4 feet thick, is invariably struck within 55 feet of the level of the river front. The product is about 5,000 tons. The existence of a second vein, which is, as near as can be ascertained, about 30 feet below the one working now, is a matter of development. The coal can be placed at Little Rock at \$3.25 a ton; at the mouth of the Arkansas River, \$3.75 a ton; at New Orleans for \$5 a ton; at St. Louis, \$6.75 per ton."

The only coal to compete with on the lower Mississippi, from the mouth of the Arkansas to New Orleans, 600 miles—which section of country consumes about one million of tons per annum—is the Bituminous coal, principally furnished by Pittsburgh.

Professor Owen gives an analysis of the coal in the First Geological Report on Arkansas, page 130. It was also analysed by Mr. I. A. Liebig, and by L. C. Bierwirth, with the following results :

	OWEN.	LIEBIG.	BIERWIRTH.
Moisture.....	0.5	1.524	0.680
Volatile and combustible gases.....	7.9	7.527	10.521
Fixed carbon.....	85.6	85.081	83.719
Ashes.....	6.0	5.468	5.080
Total.....	100.	100.	100.
Specific gravity.....	1.335	1.3408	1.3112

In addition there is the Ouita Coal Co., producing an excellent variety of semi-anthracite, to the extent of seven thousand tons a year; the mines are seventy-two miles from Little Rock; the vein is 32 inches thick. Analysis gave 80.46 fixed carbon; 12.66 volatile matter; ash, 5.11; water, 1.77; color of ash, light brown. One or two other small mines producing less than one thousand tons annually.

## ILLINOIS.

The valuable features of the coal found in this State are, that there is plenty of it, that it is very widely distributed over the State, and readily accessible. Although it is generally necessary to mine it by means of shafts, the coal is reached at so reasonable a depth from the surface that its mining is done without unusual expense; the number of railroads travers-



ing all parts of this State, with good level grades and without curves, furnish an abundance of cheap transportation, and there is a large market for the coal that is produced.

The valuable iron-smelting Big Muddy coal, found in the southern part of the State, and extensively used at St. Louis, as well as some of a fair quality in other localities, would lead us to the hope of yet finding coal of a better quality than much of that which is now mined.

The United States census of 1870 reports the production of coal in Illinois at 2,629,563 tons. To those accustomed to the large production of Eastern mines near our seaboard these figures may appear small, but it should be considered that the coal business in the West is yet in its infancy. In La Salle County there are three seams of coal, the upper four and a half to five feet thick, the middle usually six feet, and the lower four feet. The most popular in the market is the middle, as it makes a dense fire, and is largely used for steam and domestic uses. In 1870 the product was 173,864 tons, according to the census reports, and this has probably been doubled by this time. What is known as Wilmington coal is found in Will and Livingston Counties, the seam averaging three feet in thickness. The amount in 1875 was 512,800 tons. It makes a good steam coal, and is much liked for locomotive use. This district furnishes the principal supply of soft coal used in Chicago. The mining is carried on principally by three companies. The Wilmington and Vermilion Co. has a daily capacity of 1800 tons. The Star Company has a capacity of 1000 tons a day; produced 117,680 tons in 1875. The Wilmington Coal and Manufacturing Company has a producing capacity of over 500 tons daily. The Eureka Coal Co., mined 131,615 tons in 1875; the C. W. & W. Coal Co., 225,879 tons. The opening of the Chicago and Illinois River Railroad, which pierces the heart of this coal district thus furnishes Chicago with a supply of cheap and valuable fuel.

St. Louis, Missouri, obtains a large supply of Bituminous coal from the Belleville district, in St. Clair County, Illinois. This county contains 450 square miles of coal, and the last census returns show a production in this county of 793,810 tons. The principal seam worked is from five to seven feet in thickness, and is economically mined. Analysis of this coal shows: Water, 6; volatile matter, 33.8; fixed carbon, 55.2; ash, 5.

In Vermilion County the seam is six feet thick, furnishing a good fat, soft caking coal. The vein is from seventy to one hundred feet below the surface, and is very thick and of excellent quality. Mining was begun in 1867. The annual product is 250,000 tons.

The production of coal in the entire State in 1875 is estimated at 3,750,000 tons.

## INTERESTING FACTS AND FIGURES.

### WEIGHT OR MEASURE.

The Constitution of the United States provides for a "standard of weights and measures," but present there is not a national observance of this enactment. We have bushels, boxes, hogshead tons 2,000 lbs., and 2,240 lbs., oftentimes two or more systems in one State, and occasionally in same region. We propose that all coal be mined, carried and sold at 2,000 lbs. to the ton, wholesale and retail. It will then be possible to calculate production, compare prices and in fact, set the whole trade on a substantial foundation, which is impossible under the present disorganized and sectional system of measurement. Reader, will you please give this matter your earnest attention?

### LARGE MINE VENTILATOR.

The largest mine ventilator in the world is a Gulbal fan, 45 feet in diameter, and 12 feet face, at the Usworth colliery, near Newcastle-on-Tyne, England. This fan runs about forty-five revolutions per minute, and is said to circulate 200,000 to 250,000 cubic feet of air per minute. It is driven by two first motion engines, 36 inch diameter cylinders, 3 feet stroke. The upcast shaft is 10 feet diameter, and 600 feet deep. The workings in three seams are ventilated through it. The output of the Usworth Colliery is about 1,500 tons per day. The mines are very extensive. All the underground haulage is performed by machinery; two of the three seams are worked on the bord and pillar system; the other is worked on the longwall plan.

### COAL TRADE ON LAKE ERIE.

The first time that Bituminous coal appears as an article of commerce on the Lake was in the year 1829, when the northern division of the Ohio canal was opened from Akron, Ohio, on the edge of the Ohio coal field. Up to 1854 it was brought by this means to Cleveland. In that year the Cleveland and Pittsburgh and the Cleveland and Mahoning roads penetrated the coal fields, and gave another outlet. The Bituminous coal from Mercer County, Pennsylvania, is received and shipped at Erie, Pennsylvania. These two ports transact about all the Bituminous coal business between Pennsylvania and Ohio on the lakes.

### ASPHALTUM DEPOSITS.

Asphalt is a natural mineral bitumen, and is composed of asphaltene and petroleum. In nature it is found combined with carbonate of lime and other mineral substances. It fuses only at about 400 degrees Fahrenheit, and maintains its hardness under a constant heat of 150 degrees Fahrenheit. This substance was formerly obtained almost solely from the neighborhood of the Dead Sea, but within five years, the great lake of asphalt in the Island of Trinidad has been used as a source to supply both for the United States and Europe. This lake is one of the most remarkable natural curiosities in the world, and its existence has never been satisfactorily explained. It is circular in shape, and covers about 114 acres. Its depth is unknown, although it is estimated to be 800 feet.

The asphaltum constantly bubbles up in the centre, and flows outward. On the outer edges it hardens, and will sustain carts and teams 200 or 300 feet from the shore. It is cut out in blocks refined by heat, and finds its way to market molded into barrels. For paving city streets, asphalt is fast coming into general use in Europe. In Paris, all the boulevards and other principal streets are paved with it, and in London no other material is now allowed to be used for laying pavement.

### COAL IN RHODE ISLAND.

The Mount Hope coal mine, in Portsmouth, Rhode Island, contains the hardest Anthracite in this country, if not in the world. It is much lighter colored than the ordinary Anthracite, and in many places it strongly resembles plumbago. The mine yields about 15,000 tons a year, and it is a pretty good fuel, though when the beds were opened, many years ago, it was thought to be next worthless. It sells for from \$2.50 to \$4.50 a ton at the mine. Large quantities of this coal are consumed at the mine, in smelting copper from Chili.

### COAL IN TEXAS.

The coal-bearing rocks of Texas occupy an area of not less than six thousand miles, embracing the counties of Jack, Young, Palo Pinto, Eastland, Brown, Comanche, Callahan, Coleman, and extending to the territory of Bexar. The rocks contain the characteristics belonging to the co-

measures of Missouri and other Western States. In general appearance this coal resembles that of Belleville, Illinois. The analysis gives:—Fixed Carbon, 52 per cent.; Volatile Matter, 36 per cent.; Ashes, 3 per cent. It cokes with a great flame, without changing its form. Anthracites, lighter and more brittle than those of Pennsylvania, have been found in various parts of the State. Lignites, and other coals of more recent origin, occupy an area of ten thousand square miles.

### UNDERGROUND TEMPERATURE.

Regarding underground temperatures, a very valuable set of observations has been received from a mine, 1,900 feet deep, in Prague, Bohemia. The depths, and corresponding temperatures are as follows:

Depth in feet.	Degrees Fahrenheit.	Depth in feet.	Degrees Fahrenheit.
68	47.9	1290	58.3
239	48.8	1414	59.4
621	50.7	1652	61.4
939	57.8	1900	64.1

### DEEPEST COAL PIT.

The deepest pit in the world is said to be at Chatelneau, three miles from Charleroi, Belgium. It is 2822 feet deep from the surface, and it was intended to sink another shaft in a tunnel from the bottom of the first shaft, a further depth of 492 feet, making a total depth of 3314 feet. The deepest coal shaft in England is the Dunkenfield, 2,060 feet, took ten years time to sink, cost \$500,000, and this to reach a bed of coal only 4 ft. 8½ inches thick.

### DISTANCES TO MARKET.

The following are the distances from a portion of the American coal fields, to the different tide-water markets:

FROM	BY	MILES.
Pottsville to New York.....	Canal	926
Pottsville to New York.....	Rail and Water	196
Pottsville to Philadelphia.....	Canal	106
Pottsville to Philadelphia.....	Rail	93
Mauch Chunk to New York.....	Lehigh Canal	172
Mauch Chunk to New York.....	Morris Canal	147
Mauch Chunk to New York.....	Rail	126
Mauch Chunk to Philadelphia.....	Canal	124
Mauch Chunk to Philadelphia.....	Rail	89
Carbondale to New York.....	Rail and Canal	208
Seranton to New York.....	Rail	143
Wilkesbarre to New York.....	Rail	192
Wilkesbarre to Philadelphia.....	Rail and Canal	168
Wilkesbarre to Mauch Chunk.....	Rail	55
Wilkesbarre to Baltimore.....	Rail and Canal	260
Wilkesbarre to Baltimore.....	Canal	246
Shamokin to Baltimore.....	Rail and Canal	200
Shamokin to Baltimore.....	N. Cent. R. R.	158
Cumberland to Baltimore.....	Rail	178
Cumberland to Georgetown.....	Canal	184
Cumberland to Alexandria.....	Canal	191
Broad Top to Philadelphia.....	Rail	243
Clearfield to Philadelphia.....	Rail	240
Westmoreland to Philadelphia.....	Rail	332
Blossburg to New York.....	Rail	300
Kanawha to Richmond.....	Rail	325

### COAL IN MICHIGAN.

The only coal that has been used at all successfully, that is mined in this State, is found in Jackson County. The business is very small, amounting to not over 30,000 tons annually. An analysis gives it:—Carbon, 45; Volatile Matter, 39; Ash, 2; Sulphur, 2; Water, 2. This great State is therefore supplied with fuel by our Pennsylvania and Ohio coal mines.



## VOLUME OF GAS OBTAINED FROM A TON OF COAL.

	CUBIC FEET.	SPECIFIC GRAVITY.
Boghead Cannel.....	13,334	.42
Wigan Cannel.....	15,426	.73
Cannel.....	15,000	.58
Cape Breton.....	9,500	—
Cumberland.....	10,000	—
English, <i>mean</i> .....	11,000	.24
Newcastle.....	10,000	.05
Kilkenny.....	12,500	.04
Oil and Grease.....	23,000	.67
Pictou and Sydney.....	8,000	—
Pine Wood.....	11,000	.66
Pittsburgh Coal.....	9,520	—
Resin.....	15,600	.66
Scotch Coal.....	15,000	.56
Virginia Coal.....	8,963	—
Wallsend.....	12,000	.42

## CUBIC CONTENTS OF A TON.

Few persons have any idea as to the amount of coal that can be stowed in a given space; we therefore give an example of the manner in which it may be figured up. A shed or room, 15 feet high, 18 feet wide, and 30 feet long, will hold 200 tons of Anthracite coal, and perhaps ten tons less of Cumberland. Thus  $15 \times 18 \times 30 = 3100$ , divided by 4, average cubic contents of a ton of Anthracite—202½.

The average number of cubic feet required to stow a ton of coal is as follows:

## BITUMINOUS.

Cumberland, maximum.....	42.3
do. minimum.....	41.2
Duffryn, (Welsh).....	42.99
Cannel, (Lancashire).....	46.37
Blossburg, Pa.....	42.2
Hartley, Newcastle.....	44.
Pictou, Nova Scotia.....	45.
Pittsburgh, Pa.....	47.03
Sydney, Cape Breton.....	47.02
Clover Hill, Va.....	49.02
Cannelton, Indiana.....	47.
Scotch.....	43.03
Richmond, Va., (Midlothian).....	41.04

## ANTHRACITE.

Peach Mountain.....	41.06
Forest Improvement.....	41.07
Beaver Meadow, No. 5.....	39.08
Lackawanna.....	45.08
Lehigh Co's.....	40.05
Beaver Meadow, No. 3.....	40.07

## COKE.

Natural of Virginia.....	43.03
Pittsburgh.....	70.09
Charcoal.....	104.

—FROM JOHNSON'S REPORT TO THE NAVY DEPARTMENT.

## THE MECHANICAL EQUIVALENT OF HEAT.

In an elaborate paper by Professor Joule, we have results thus stated:—1. The quantity of heat produced by the friction of bodies, whether solid or liquid, is always proportional to the quantity of force expended. 2. The quantity of heat capable of increasing the temperature of a pound of water

by 1° Fahrenheit, requires for its evolution the expenditure of a mechanical force required by the all of 772 pounds through the space of one foot.

Dr. Tyndall gives the following explanation of the term "foot-pounds," used as a measure by Boule:—The quantity of heat which would raise one pound of water one degree in temperature is exactly equal to what would be generated if a pound-weight after having fallen 772 feet, had its moving force destroyed by collision with the earth. Conversely, the amount of heat necessary to raise a pound of water one degree would, if applied mechanically, be competent to raise a pound-weight 772 feet high, or it would raise 772 pounds one foot high. The term "foot-pound" expresses the lifting of one pound to the height of a foot. Thus the heat required to raise the temperature of one pound of water one degree being taken as the standard, 772 foot-pounds constitute what is called the *mechanical equivalent of heat*.

### ALBERT COAL—"ALBERTITE."

Prof. Henry Wurtz, writes:—"This very remarkable material from New Brunswick is too well known to all gas engineers in the Eastern United States to require any description here. Its almost complete freedom from sulphur and from ash, and its very large yield of rich gas, makes it the most highly esteemed of all the enriching materials at present available for gas-making in the eastern portion of the United States. Unlike most cannels, its use does not sensibly impair the value of the coke produced; while it imparts, even in quantities as small as five per cent., a very satisfactory quality to the gas from common caking coals. It is not well suited to carbonization alone, owing to its highly inflammable nature, in which it resembles asphaltum. But we have obtained some results with it by the hydrocarbon process which are hereafter given."

The following results on its gas-producing powers by the common process were obtained at their experimental works by the Manhattan Gas Light Co., in New York:

Weight of charge per retort, 224 lbs. Time of carbonizing, three hours and ten minutes.

Yield of gas per ton of 2,240 lbs., 14,794 feet, (equal to 6.6 feet per lb.) Illuminating power of three cubic feet burnt in a Scotch tip fish tail, 29.74 candles, equal per five cubic feet, to 49.55 candles

Yield of coke, per ton, 16.8 bushels. Weight of coke, per ton, 806 pounds. Gas perfectly purified by lime. The coke burns well and rapidly, without clinker.

#### ANALYSIS OF COAL.

Volatile matter.....	57.70
Fixed Carbon.....	41.90
Ash.....	0.40

We deduce from this the value of one ton in lbs. of sperm equal 2511.57 lbs.

### PRICES OF SCHUYLKILL COAL.

We give below the average prices for Schuylkill White Ash Coal, on board vessels at Philadelphia, from 1834 to 1873, inclusive; prepared by W. G. Neilson, and I. W. Morris, Jr.:

Years.	Prices.	Years.	Prices.
1834.....	\$4 50	1854.....	\$5 19
1835.....	4 84	1855.....	4 49
1836.....	6 64	1856.....	4 11
1837.....	6 72	1857.....	3 87
1838.....	5 27	1858.....	3 43
1839.....	5 00	1859.....	3 25
1840.....	4 91	1860.....	3 40
1841.....	5 79	1861.....	3 39
1842.....	4 18	1862.....	4 14
1843.....	3 27	1863.....	6 06
1844.....	*3 20	1864.....	†8 39
1845.....	3 46	1865.....	7 86
1846.....	3 90	1866.....	5 80
1847.....	3 80	1867.....	4 37
1848.....	3 50	1868.....	3 86
1849.....	3 62	1869.....	5 31
1850.....	3 64	1870.....	4 39
1851.....	3 34	1871.....	4 46
1852.....	3 46	1872.....	3 74
1853.....	3 70	1873.....	4 19

\*Lowest point. †Highest point.

## COMPARATIVE YIELD OF COAL BEDS.

Comparison of yield of north and south dipping coal beds, in 1856, in Schuylkill County, Pa.

North Dip, 10 collieries, Red Ash. . . . .	84,735 tons.
North Dip, 5 collieries, White Ash. . . . .	91,222 tons.
South Dip, 48 collieries, Red Ash. . . . .	570,561 tons.
South Dip, 26 collieries, White Ash. . . . .	745,231 tons.
North and South Dip, 11 collieries, Red Ash. . . . .	395,022 tons.
North and South Dip, 5 collieries, White Ash. . . . .	120,101 tons.

The north dips are steeper in the Schuylkill basin than the south, and therefore more slipped and crushed, thinner and more broken. This is one of the principal arguments for the "Wave Theory of Rogers."

## BREAKING STRAIN OF WIRE ROPE.

## ROPE OF 133 WIRES.

	Circumference.	Diameter.	Strength.
	Inches.	Inches.	Tons.
No. 1. . . . .	6 $\frac{3}{4}$	2 $\frac{1}{4}$	74.
No. 2. . . . .	6	2	65.
No. 3. . . . .	5 $\frac{3}{4}$	1 $\frac{3}{4}$	54.
No. 4. . . . .	5	1 $\frac{1}{2}$	43.
No. 5. . . . .	4 $\frac{3}{4}$	1 $\frac{1}{2}$	35.
No. 6. . . . .	4	1 $\frac{1}{2}$	27.
No. 7. . . . .	3 $\frac{3}{4}$	1 $\frac{1}{2}$	20.
No. 8. . . . .	3 $\frac{1}{2}$	1	16.
No. 9. . . . .	3	$\frac{3}{4}$	11.
No. 10. . . . .	2 $\frac{1}{2}$	$\frac{3}{4}$	8.
No. 10 $\frac{1}{2}$ . . . . .	2	$\frac{3}{4}$	5.
No. 10 $\frac{3}{4}$ . . . . .	1 $\frac{3}{4}$	8-16	4.
No. 10 $\frac{1}{2}$ . . . . .	1 $\frac{1}{2}$	$\frac{3}{4}$	3.

—JOHN A. ROEBLING'S SONS.

## WEIGHT OF T RAIL.

Weight of T rails in pounds per yard, and in tons of 2,240 pounds per mile.

At 16 pounds per yard it requires 25 tons and	325 pounds per mile.
At 18 pounds per yard it requires 23 tons and	640 pounds per mile.
At 20 pounds per yard it requires 31 tons and	660 pounds per mile.
At 22 pounds per yard it requires 34 tons and	1280 pounds per mile.
At 25 pounds per yard it requires 39 tons and	640 pounds per mile.
At 28 pounds per yard it requires 44 tons	per mile.
At 30 pounds per yard it requires 47 tons and	320 pounds per mile.
At 33 pounds per yard it requires 51 tons and	1920 pounds per mile.
At 45 pounds per yard it requires 65 tons and	960 pounds per mile.
At 48 pounds per yard it requires 75 tons and	960 pounds per mile.
At 58 pounds per yard it requires 106 tons and	1920 pounds per mile.

## THE DUTY ON COAL.

There is no Anthracite imported. On Bituminous coal the duty is 75 cents per ton, gold, on the coarse coal; and on the culm of coal 40 cents per ton gold, since August 1st, 1872. Previous to that date it was \$1.25 per ton, and 25 per cent. *ad valorem*, respectively.

## MODES OF WORKING ADOPTED IN THE COAL MINES OF GREAT BRITAIN.

BANKS AND STRAIT WORK, BORD AND, LONGWALL.—Yorkshire.

BORD AND PILLAR.—Northumberland, North Durham, Cumberland, South Durham, North Staffordshire, Cheshire and Shropshire.

BORD AND PILLAR AND LONGWALL.—East and West Scotland.

LONGWALL.—Derbyshire, Nottinghamshire, Leicestershire, Warwickshire, South Staffordshire, Worcestershire.

SPECIES OF BORD AND PILLAR.—North, East and West Lancashire, South Wales.

STRAIT AND STALLS.—Monmouthshire, Gloucestershire, Somersetshire, Devonshire, South Wales.

\*Special method of working ten yard seam.



## COAL PRODUCTION OF THE GLOBE.

COMPILED BY JAMES MACFARLANE.

The following will show the coal area of the principal coal producing countries, together with the production for the years 1870, 1871, 1872 and 1873.

	Square miles of coal.	1870.	1871.	1872.	1873.
Great Britain.....	11,900	110,431,192	117,352,029	123,497,316	127,016,747
United States.....	192,000	32,863,690	41,030,000	45,000,000	50,512,000
Germany.....	1,800	23,316,233	37,852,463	42,324,466	45,335,741
France.....	2,086	6,550,000	13,400,000	15,809,005	17,500,000
Belgium.....	900	13,697,118	13,733,176	15,658,943	17,000,000
Austria.....	1,800	6,443,575	9,891,350	10,389,952	11,000,000
Russia.....	30,000	696,209	829,722	1,097,832	1,200,000
Spain.....	3,501	414,482	500,000	570,000	570,000
Portugal.....				18,000	18,000
Nova Scotia.....	18,000	625,769	673,242	880,950	1,051,567
Australia.....		800,000	790,143	942,510	1,000,000
India.....	2,004	500,000	500,000	500,000	500,000
*Other countries.....		1,000,000	1,000,000	1,000,000	1,000,090
		197,338,273	236,522,124	257,778,979	273,704,055

## AVERAGE CONTENTS OF COAL CARS.

The Central Railroad (of N. J.) scales at Penobscot, Luzerne Co., Pa., give the average weight of coal of each kind, and measurement of contents, as below :

Lump.....	32.2 cubic feet per ton of 2240 pounds.
Broken.....	33.9 cubic feet per ton of 2240 pounds.
Egg.....	34.5 cubic feet per ton of 2240 pounds.
Stove.....	34.8 cubic feet per ton of 2240 pounds.
Chestnut.....	35.7 cubic feet per ton of 2240 pounds.
Pea.....	36.7 cubic feet per ton of 2240 pounds.

## FIRST USE OF COAL AS FUEL,

The Chinese, forerunners in most discoveries, knew its value centuries ago; in their own country the Romans are known to have used it, and from the twelfth century to the present day there has been an ever increasing trade in that most important of minerals. As long ago as in Edward the Sixth's reign (1552), coal was sent to France.

## COAL IN SPAIN.

The area of the coal fields in Spain is set down at 2,241,595 acres; the product is about 525,000 tons of coal, and 45,000 tons lignite or brown coal, annually. The figures for 1873 being 589,707 tons of 2200 lbs.—ten metric quintals. The Spanish coal fields are in the provinces of Castile, Leon and the Asturias. The process of extraction is described as being quite rude and imperfect.

## VARIETIES OF COAL.

**ANTHRACITE** contains eighty-five to ninety-three per cent of carbon, rarely more than seven and a half per cent of volatile matter; in extreme western portion of the basin in Pennsylvania a Semi-Anthracite, containing as much as ten or fifteen per cent of volatile matter, has been found.

**BITUMINOUS**—This is somewhat a deceptive term; it does not mean that any bitumen or mineral pitch, soluble in ether, is contained in it, but that the gases (oxygen, hydrogen and nitrogen) enter more largely into its composition than in Anthracite, and give it a more flaming character in burning.

**SEMI-BITUMINOUS** is that particular kind which, while it yields coke and combustible gases, usually contains eleven or twelve and never more than eighteen per cent of volatile combustible matter, and not less than seventy and never more than eighty-four per cent of carbon.

\* Italy, New Zealand, Chili, China, Japan, South America and all other countries producing lignite.

## UNDERGROUND HAULAGE OF COAL.

At the Hazard Collieries, near Liege, Belgium, the workings of the collieries are situated at a depth of 390 feet, and the chief bulk of the coal is drawn through an adit 3500 yards in length, the shaft being only used for men and materials and a small portion of the coal. In the adit mentioned the arrangements above named are fixed, the haulage being effected by an endless chain driven by an engine characterized by several special features.

The adit or tunnel is laid with two lines of rails, one for the out going full wagons, and another for the in going empties; these lines being  $21\frac{1}{2}$  in. gauge. At the outer end of the tunnel is fixed a strong girder spanning the tunnel and carrying six pulleys; the chain, as we have said, is endless, and the outgoing portion drawing the full wagons, passes over a vertical and a horizontal pulley, then off to the hauling engine. From the engine the chain returns passing round two horizontal and two vertical pulleys, crossed, and into the tunnel. At the inner end of the tunnel the chain passes around a stretching pulley, which can be adjusted by a screw. There are three curves or rather bends in the tunnel; on approaching each curve from the near end of the tunnel, the line for the loaded wagons is gradually raised with a gradient of 15 per 1000 by placing timber under the rails until the level of the latter has been raised 7½ inches.

From this point the line is made to fall again, and at 4 ft. 11 in. from the highest place, or just at the bend of the tunnel, there is fixed a timber framing, carrying horizontal pulleys, these pulleys being so situated that the chain in passing round them is carried clear of the wagons, the latter thus pass round the bend by the action of gravity, the chain being again brought to act upon them when they arrive at the straight part of the tunnel by a depressing pulley; the chain, as will be noticed, gives motion to the wagons simply by resting on them. For the in going empties, the arrangement is exactly similar, save that the line is gradually raised as it approaches the bend from the outer end of the tunnel. The arrangement is said to have proved very efficient, and hence is well worthy of notice.

## BLASTING MEMORANDA.

The following table gives the space occupied by any given quantity of powder in round holes of different sizes from one to six inches diameter:

Diameter of the hole.	Powder contained in a	Powder contained in a		Depth of hole to contain 1 lb powder.
	1 in. hole.	1 ft. hole.		
	Oz.	lb.	oz.	Inches.
One.....	0.1	-	5.0	33.19
One and one-half.....	0.9	1	11.3	17.63
Two.....	1.7	1	4.1	9.55
Two and one-half.....	2.6	1	15.4	6.11
Three.....	3.8	2	13.2	4.24
Three and one-half.....	5.1	3	13.6	3.12
Four.....	6.7	5	0.4	2.39
Four and one-half.....	8.5	6	5.8	1.89
Five.....	10.5	7	13.7	1.53

The rules for calculating the amount of powder for a given weight is that "the charges are proportional to the cubes of the lines of least resistance," that is if from experiment we find that in a certain rock four ounces of powder is sufficient to blow out a hole where the depth of the line of least resistance from the bottom of the hole to the surface is two feet, then for one where this depth is eight feet the charge would bear the same proportion to four ounces as 2.3 does to 8.3, that is sixty-four times; it would consequently be sixteen pounds.

## THE VENTILATING FURNACE.

Properly constructed furnaces, well maintained and spacious air-passages, carried well forward, will admit of an abundant flow of air along the galleries of a mine. The furnace should be placed at the bottom of the up-cast shaft, and never at the top, as is sometimes done, no matter how limited the requirements of a mine may be. Deep shaft mines never have more air than shallow ones with the same furnace power, as a deep shaft gives to a longer column of heated air. The practical power of the furnace is in proportion to the depth of the shaft, the power being as the ratio of the depth. The best place for the furnace is from 110 to 150 feet from the bottom of the up-cast shaft, as there the danger is avoided of setting the wooden structures of the shaft on fire. Many a destructive and fatal mine catastrophe has resulted from the furnace being placed in too close.

proximity to the wood work of the air shaft, of which the Avondale horror, was, perhaps, the most terribly destructive to human life. The passage from the furnace to the up-cast shaft should be made to slant upwards. The furnace should be of an area proportioned to the area and extent of the air passages of the mine. For an air course of 36 feet of area, a furnace of six feet in width, three feet of height above the fire bars, and from two to three feet of depth under the bars would be a fair proportion. A wide furnace is better than a high one, as it admits of a thin fire and thus more effectually heats the air in its passage through the furnace. The up-cast shaft should also be of a proper structure. Too small a shaft confines the air in passing upward, and too large a one does not get sufficiently heated by the hot ascending column of air. For an air course of 36 feet of sectional area, and a six foot furnace, the up-cast shaft should be about 30 feet. In former times it was the general practice to pass the whole of the return current of air through the furnace. In fiery mines frequent explosions occurred from the inflammable air returning to the furnace in an undiluted state. The gas would flame backwards in the mine, like a train of gunpowder, carrying death and destruction in its track. A torrent of water, called the water fall, had to be kept constantly on hand, to be thrown down the shaft to extinguish the fire. In the year 1807, Mr. Buddle had his mind intently occupied with this subject, and he devised a remedy in the dumb furnace. He split the air at the bottom of the down-cast shaft, feeding the furnace with pure air direct from the down-cast, and sending the return foul current into the up-cast shaft by a dumb drift cut in the roof above the coal. The miners were at first very much opposed to this plan, believing that the current of air by being split would lose its ventilating power. Since Mr. Buddle's time an improved dumb furnace has been made by Mr. John Smith, an intelligent mining captain, of the North of England. This furnace also fed with fresh air from the down-cast shaft, has two brick arches above the fire, for the passage of the foul return current of air into the up-cast shaft, and two air gates, one on each side of the fire to cool down the temperature between the brick work and the coal. It is only in mines subject to discharges of inflammable gas that these precautions are necessary. Unfortunately they are not as generally adopted as that necessity would seem to warrant. The Lund Hill explosion, which occurred in England, in 1855, by which 139 miners were destroyed, was believed to have been caused by the fire-damp exploding, in passing through the furnace, and an explosion from this cause occurred in a coal mine in Ohio.

## THE PROPERTIES OF COMPRESSED AIR.

When air is compressed, a more rapid motion is set up among its molecules than before existed, and this increase of motion is accompanied by the development of much heat. This increase of temperature causes the air to expand, and hence introduces a force which opposes the compressing power. Thus we are enabled to account for the fact that a certain compressing force of steam or of water does not secure corresponding power in the air which is compressed. The loss of power on this account has been much diminished by improvements in the machinery used, and it is very probable that it will be much further reduced. The poor conducting power of the air makes the removal of the heat less rapid than we would wish.

If a certain volume of air is put into a smaller space, its molecules are brought closer together. This causes increased tension of the air, and thus we secure our power.

It seems that air at the highest pressure does not develop the greatest percentage of the force required to compress it. Upon this point, Wm. Daniel of Leeds, Eng., made a number of experiments. His air compressor had two steam cylinders of 16 inches diameter and 30 inches stroke, and two air cylinders of the same dimensions. The engine worked a friction brake. When the pressure of the air was 40 lbs. the useful effect on the brake was only 25½ per cent. of the power indicated on the steam gauges.

When it was	34 lbs.	the useful effect was	27 per cent.
"	" 28 "	"	28 " "
"	" 24 "	"	36 " "
"	" 19 "	"	45½ " "

A different relation in the dimensions of the air and steam cylinders would doubtless have affected the results.

When compared with steam, compressed air as a motive power has many advantages. It may be used at as high a pressure as steam, and in an engine neither more complicated nor more expensive. It will not condense as steam does, and for this reason is a valuable motive power when it is desired to convey it long distances.

Compressed air as a motive power has an advantage of hot air, for in doing its work it is simply regaining its natural condition.



## RULES FOR USING WIRE ROPES IN DEEP SHAFTS.

The following rules will be of interest to those having occasion to use wire ropes in deep shafts:

The safe or working load should be from one-seventh to one-fifth of the breaking strain, according to the conditions under which the rope is used; the greater the vibration and velocity of the rope, the greater should be the allowance for safety.

The weight of a wire rope is about one-sixth (or .167) of a pound per cubic inch, or two pounds per foot in length per square inch section, and the proportion between the weight of a rope and its working load is as follows:

	Steel.	Charcoal Iron.
Weight per foot of rope for one ton (2000lbs.) working load.....	$\frac{1}{2}$ lb.	$\frac{1}{2}$ lb.
Length of rope of uniform section, at which the weight of the rope is equal to its working load.....	6,000 ft.	4,000 ft.

*Rule for finding the section at any point of a Taper rope of uniform strength:*

$S$  = section of rope in inches.

$W$  = weight of wagon, cage, etc., applied at the end of the rope.

$w$  = weight of one foot in length of the small end of the rope.

$x$  = distance in feet from the end at which  $W$  is applied to the section  $S$ .

$e$  = 2.7183.

$f$  = working or safe strain in pounds per square inch section of the rope.

— 12,000 pounds for steel.

— 8,000 pounds for charcoal iron.

$$S = \frac{W}{f} e^{\frac{wx}{f}}$$

The weight of the rope for  $x$  feet from the end is

$$fS - W - W \left\{ \frac{e^{\frac{wx}{f}}}{e^{\frac{wx}{f}} - 1} \right\}$$

The working load ( $f$ ) is made up of the weight applied at the end of the rope (wagon, mineral cage, etc.), of the rope itself, and of the energy exerted in imparting velocity to the load. In shafts hoisting at a great speed this is an important item in the load; it is expressed by the formula,

$$\frac{W_1 V_2}{2g}, \text{ in which}$$

$W_1$  = the load in pounds.

$V$  = increase in velocity in a second.

$g$  32.2 = gravity.

If we take for example a shaft where  $W_1 = W + W_0 = 15,000$  pounds,  $W_0$  being the weight of the rope, the velocity attained in the first second =  $V = 10$  feet, we have the energy expended in getting up this velocity,

$$\frac{W_1 V_2}{2g} = \frac{1,500,000}{64.4} = 2,329 \text{ pounds,}$$

which amount has to be added to  $W + W_0$  in order to get the working strain on the rope, when we neglect the friction on the guides, the resistance of the air, rigidity of the rope, friction of sheaves on their axles, etc., which are smaller in amount, and are provided for, as is also the wear and tear of the rope, in the margin of 5 to 1 or 6 to 1, which is allowed for safety in the use of wire ropes.

## TABLE FOR COMPUTING THE PRICE OF COAL.

PREPARED BY E. S. DRAKE.

LEBS.	\$5.50	5.75	6.00	6.25	6.50	6.75	7.00	7.25	7.50	7.75	8.00
10.....	3	3	3	3	3	3	4	4	4	4	4
20.....	6	6	6	6	7	7	7	7	8	8	8
30.....	8	9	9	9	10	10	11	11	11	12	12
40.....	11	12	12	13	13	14	14	15	15	16	16
50.....	14	15	15	16	16	17	18	18	19	19	20
60.....	17	18	18	19	20	20	21	22	23	23	24
70.....	19	20	21	22	23	24	25	25	26	27	28
80.....	22	23	24	25	26	27	28	29	30	31	32
90.....	25	26	27	28	29	31	32	33	34	35	36
100.....	28	29	30	31	33	34	35	36	38	39	40
500.....	1.33	1.44	1.50	1.56	1.63	1.69	1.75	1.81	1.88	1.94	2.00
1000.....	2.75	2.88	3.10	3.13	3.25	3.38	3.50	3.63	3.75	3.88	4.00
1500.....	4.13	4.32	4.51	4.69	4.88	5.07	5.25	5.44	5.63	5.82	6.00
2000.....	5.50	5.75	6.00	6.25	6.50	6.75	7.00	7.25	7.50	7.75	8.00

## COAL IN THE UNITED STATES.

The extent of the coal fields of the United States is given as 192,070 square miles, divided as follows:

	Square Miles.		Square Miles.
New England basin.....	500	Illinois basin:	
Pennsylvania Anthracite.....	472	Illinois section.....	36,800
Appalachian basin:		Indiana section.....	6,450
Pennsylvania section.....	12,332	West Kentucky section.....	5,838
Maryland section.....	550	Missouri basin.....	26,887
West Virginia section.....	16,000	Texas basin.....	4,500
Ohio section.....	10,000	Iowa.....	18,000
East Kentucky section.....	18,983	Nebraska.....	3,000
Tennessee.....	5,100	Kansas.....	17,000
Alabama.....	5,330	Arkansas.....	9,043
Michigan basin.....	6,700	Virginia.....	185
		North Carolina.....	310

The product keeps at about 50,000,000 tons annually, the business during the years 1873, 1874, and 1875 being, as stated below:

	1873.	1874.	1875.
Pennsylvania Anthracite.....	22,523,178	22,785,008	22,011,627
Pennsylvania Bituminous.....	11,695,383	11,053,615	11,500,000
Ohio.....	3,944,340	4,163,445	4,868,252
Illinois.....	3,500,000	3,500,000	3,700,000
Maryland, Cumberland.....	2,674,100	2,410,895	2,342,773
Indiana.....	1,000,000	1,000,000	1,000,000
Missouri.....	900,000	900,000	900,000
West Virginia.....	600,000	600,000	600,000
Tennessee.....	350,000	425,000	425,000
Kentucky.....	300,000	400,000	425,000
Iowa.....	350,000	400,000	425,000
Virginia, Richmond coal field.....	60,000	80,000	80,000
Alabama.....	40,000	50,000	60,000
Michigan.....	30,000	30,000	30,000
Kansas.....	50,000	75,000	75,000

## WESTPHALIA.

The Westphalia coal basin of the Ruber, (Prussia) in 1873, produced 16, 213, 964 tons of coal, and in 1874, 15, 351, 131 tons.

## COAL IN ITALY.

The product of coal in Italy, in 1874, was, 2,000 tons of Anthracite (?) 90,500 tons of Brown coal, and 90,000 tons of Peat coal.

## EXPENSES ON BITUMINOUS COAL TO THE ATLANTIC SEA BOARD.

West Virginia Gas Coal (Fairmount 302 miles, Clarksburg 311 miles) to Baltimore \$4.75 per ton of 2,000 lbs. Drawback allowed on shipments to Eastern Ports, \$1.30 per ton.

Pennsylvania Gas Coal from Irwin or Penn Station to West Philadelphia 332 miles. In cars of Pennsylvania Railroad Company per 2,000 lbs, \$4.75.

West Virginia [Kanawha] via Chesapeake and Ohio Railroad, Blacksburg to Richmond for shipment, on Bituminous or Splint, \$3.40, (special rate \$3), and \$4.50 (special rate \$4) on Cannel.

Broad Top semi-bituminous, to Philadelphia, say 242 miles \$3.30 per net ton, with a drawback of 75 cents, making toll on New York and Eastern shipments equal to \$2.90 per gross ton.

George's Creek from Cumberland, Md., to Baltimore 178 miles \$1.80 per 2,000 lbs. and four cents per gross ton for use of cars; from Piedmont 206 miles, \$2.15 per 2,000 lbs.

George's Creek, by C. & O. Canal, from Cumberland to Georgetown, 184 miles, \$1.61 per ton of 2,240 lbs., to Alexandria, Va., 191 miles, \$1.69 per ton of 2,240 lbs.

From Pennsylvania State line to South Amboy, N. J., for shipment \$3.00 per 2,000 lbs.

Clearfield, Pa. Bituminous, from Osceola, and other stations on the Tyrone and Clearfield branch of the Pennsylvania Railroad, to Philadelphia, say 248 miles, \$4.03 per 2,000 lbs; to South Amboy 417 miles, 3.61 per 2,000 lbs. with drawback, according to destination of the coal.

George's Creek from the mines to Cumberland or Piedmont, 2 cents per ton per mile where the distance exceeds ten miles; 3 cents where the distance is from four to ten miles; and 4 cents where the distance is four miles or less.

## PETROLEUM OR COAL GAS-LIGHT.

Illuminating gas as a substitute for oil and candles dates back to the early part of the present century. As a means of general illumination it has been in use in this country for about fifty years and during that entire time there seems to have been no general or abiding attempt to improve its illuminating power.

The following fundamental rules underlie the whole business:

First: *The amount of light that gas will give is dependent upon the amount of carbon it contains.*

The amount in coal gas is only from four (4) to eight (8) per cent. of its gross bulk. In oil and rosin gas it is greater.

Second: When too much gas is made from a ton of coal it contains less carbon to the foot—and consequently consumes faster than better gas.

Third: As a general statement, the larger the burner used the better the result obtained from a given quantity of gas, unless the burner is so large as to cause the gas to smoke. For example a six foot burner (a burner consuming six cubic feet of gas per hour) will give more light than two smaller burners of the same pattern consuming *four feet each* per hour, and the use of still smaller burners is still more wasteful.

Fourth: The best dry meters are not only reasonably accurate measures, when well made, but after being tested and sealed by the inspector, cannot be altered or changed in their measuring by either the company or the consumer.

Fifth: *The admixture of air or other dilutant element with gas has a still more hurtful effect than diminishing the size of the burner.* Approximately every ounce of air, when mixed ~~an~~ with ordinary gas destroys the lighting power of an equal weight of gas.

Sixth: Gas should not be burned at a pressure greater than one inch hydrostatic at the burner. An increase of pressure causes an increase in the amount of gas consumed, without any corresponding increase in the amount of light given.

Seventh: Ordinary coal gas (14 candles standard) compares in cost with other illuminants as follows:

The equivalents being, approximately.

1,000 feet coal gas (14 candles standard;)

3 gallons kerosene, (as burned in a lamp;)

48 pounds of sperm, (pure sperm candles;)

200 feet of oil gas, (70 candles standard;)

400 feet of rosin gas, (35 candles standard;)

1,500 feet of "air-gas" or "gasoline gas," (10 candles standard.)

It follows that coal gas light at \$3.00 per 1,000 feet, costs as much as kerosene light at \$1.00 per gallon, or oil gas at \$15.00 per 1,000, or sperm at six cents per pound, or rosin gas at \$7.50 per 1,000, or "air gas" and "gasoline gas" at \$2.00 per 1,000.

In *practically* comparing the cost of gas and coal oil a liberal allowance should be made for lamps, wicks, chimneys, &c., which will materially lessen the difference between gas light at \$3.00 per 1,000 and kerosene at present prices.



## COLORADO.

The area of land known to be rich in lignite coal deposits in Colorado is about 7,200 square miles, lying in various parts of the Territory, on both sides of the main range. There can hardly be a doubt but that this extent will be largely increased in years to come, for new discoveries are constantly being made upon the foot-hills and plains.

Separated under heads depending more upon their geographical position than upon the character of the fuel, we find:

1. The northern mines.
2. The eastern foot-hill mines.
3. The southern mines.
4. The Summit county mines.
5. The Conejos county mines.

Of the first but little is known. Weld and Larimer counties are undoubtedly underlain by veins of lignite similar to those of Wyoming, which are at present furnishing an excellent fuel for steam engines, domestic purposes, and for some metallurgical processes. Coke made from the product of the Wyoming coal fields has been tried at both Golden and Denver for smelting silver and gold ores, and though discarded in favor of Pennsylvania coke, is considered to be a fair fuel.

The eastern foot-hill mines embrace outcroppings in Boulder and Jefferson counties, nearly all of which have been known since the early days. They are producing at present three-fifths of all the coal mined in Colorado, which is about 120,000 tons, being located nearer the centre of population than any of the other fields.

The main workings lie mostly upon the north side of Ralston Creek, which has cut through the bed and exposed its outcroppings very markedly on either side. Nearly 2,000 feet of the vein is opened. The coal is a very good sample of the product of all the foot-hill mines. It is an altered lignite that burns freely, and crumbles quickly on exposure to the rain or moist air; burns well under the boiler and in the grate, and answers excellently for nearly all the uses to which mineral fuel is put.

The following is an analysis made in 1871, by E. W. Rollins, of the Massachusetts Institute of Technology, Boston:

Hydrogen.....	4.00 per cent.
Carbon.....	66.50 per cent.
Ash.....	7.05 per cent.
Oxygen, Nitrogen and Sulphur.....	22.45 per cent.
	100.00

East of Denver, along the line of the Kansas Pacific, indications of coal are not wanting. The same formation that is found along the foot-hills, tilted up in a nearly vertical position, underlies the whole of eastern Colorado, which is one vast lignite basin, containing stores of this truly precious mineral.

The southern mines embrace those of Trinidad and Fremont county, and furnish a class of mineral entirely different from any yet found in the Territory. The latter are the oldest mines and the best known, and the demand for it is great, not only for household use, but for the manufacture of gas in Denver.

The Summit county mines are not worked, as they have only lately been brought into notice. They are located on the divide between the Bear and White Rivers, and consist of several seams varying from five to fifteen feet in thickness, which owing to the contorted strata, lie in a variety of positions, from a strict horizontal to a perfect perpendicular. Above is a stratum of sandstone varying from one to three hundred feet in thickness. The coal is of two kinds, one a hard lignite and the other similar to what is called albertite.

The Conejos beds are also new discoveries of which but little is known. Sufficient outcroppings of coal, however, have been noticed below, and west of Las Animas or Elbert, to indicate the existence of extensive lignite deposits there. The mines are hardly opened yet, but situated as they are, not more than thirty miles south of the centre of the San Juan gold and silver district, it will be but a short time before their product will be called for, should they prove at all suitable for metallurgical purposes.—*Colorado Mining Review.*

## COAL IN INDIANA.

The area of the Indiana coal measures approximates one-fifth of the entire State, and embraces the Counties of Perry, Spencer, Warwick, Posey, Vanderburg, Gibson, Pike, Dubois, Daviess, Knox, Martin, Sullivan, Greene, Clay, Vigo, Parke, Vermilion and Fountain. The most important coals, from a manufacturing point of view, are those known as the "lower block" 3.8 thick, the "main block" 4.4 thick, and "upper block" 1.10 thick. Block coal has a laminated structure, and is composed of alternate thin layers of vitreous dull black coal and fibrous mineral charcoal. It splits readily into sheets, breaking with difficulty in the opposite direction; on burning, it scarcely swells, or changes form, and never cakes or runs together. What the celebrated English chemist, Mushet, said about a certain Welsh coal, is equally applicable to the block coal of Indiana. To the purity of splint coal it unites all the softness and combustibility of wood, and the effects produced by it in the blast furnace, either as to the quality or quantity of iron, far exceed everything in the manufacture of that metal with charcoal. From careful assays, it is ascertained that this coal gives from 56 to 62 per cent. of fixed carbon, a small amount of water and a small amount of ash. Dr. E. T. Cox, the State geologist, gives this coal an exceptional character as an iron smelting fuel, and reports a ton of pig iron as being made with 4,250 pounds of block coal.

The coal in Clay County is favorably known as an iron-smelting fuel, and we append a description of its qualities. "There are two veins of coal, the upper vein averaging about three feet ten inches in thickness, and the lower one averaging about four feet. The roof is principally sand rock, slate, and slate and sand rock mixed. Fire and potters' clay of good quality underlie the coal. The average depth to the first vein is about forty-five feet from the surface, and the second or lower vein is found at an average depth of seventy-five to eighty feet. The coal is free from slate and sulphur. It burns freely, and leaves a soft, fine white ash, similar to wood ash, and no clinkers." For domestic and steam purposes, this coal is largely used in Chicago, Ill.; Indianapolis, Ind.; Kalamazoo, Mich.: and the towns and stations along the lines of most of the railroads leading from this coal district, among which may be mentioned the St. Louis, Vandalia, Terre Haute and Indianapolis Railroad; the Jeffersonville, Madison and Indianapolis Railroad; the Indianapolis and St. Louis Railroad; the Louisville, New Albany and Chicago Railroad; the Cincinnati, Lafayette and Chicago Railroad; the Lake Shore and Michigan Southern Railroad; the Indianapolis, Decatur and Springfield Railroad; and the Michigan Central Railroad.

In the block coal zone of the Indiana coal fields there are as many as eight seams of non-caking coal, four of which are of good workable thickness over a portion of the field. These are I, G, F and A, which together, have a maximum thickness of fifteen feet; and by including the other four seams, we have six feet more, making a total of twenty-one feet of block coal.

The coal of Parke County is favorably reported on for the manufacture of iron. It is a block coal, averaging five feet in thickness, weighing seventy-seven pounds to the cubic foot, and gives by analysis 62.5 fixed carbon, 31.00 volatile matter, 4.05 water, and 2 per cent. of ash. The estimated area is about 300 square miles of workable coal.

The "upper block" at Washington, in Daviess County, is extensively mined, and meets with a ready market at St. Louis, and all the towns on the Ohio and Mississippi Railroad. Its specific gravity is 1.294; a cubic foot weighs 80.87 pounds; by analysis it yields: fixed carbon, 60.00; ash, 4.50; volatile matter, 35.50. The coal worked is known as L, a five foot seam of Bituminous, an excellent caking coal, free from impurities, and may be handled and stocked without much loss; it has been used for gas making at St. Louis, and is a three foot ten inch seam of very pure coal, jet black, of cubical fracture, and bears a good reputation as a fuel, for general uses.

The census report for 1870 shows the product of coal for the year 1869 to have been 437,870 tons. The output for the year 1875 is estimated at 1,500,000 for the whole State.

## MECHANICAL STOKER.

iring apparatus, fuel-feeders, or mechanical stokers have been experimented upon for some time. A new one, recently tried with success upon a battery of marine boilers, presents some features of interest. It consists of a flat hopper placed above the fire door and before the boiler, and a mechanical device for grinding and injecting the coal. The hopper may be of any desired size. For stationary boilers, it might hold a ton or more; for marine boilers, this would depend upon the available room. The hopper ends below in an adjustable box, that may be enlarged or diminished in size as the nature of the fuel demands. In this box is a feed and crushing roller that breaks up the coal into dust or slack, and drops it below into a flat iron box holding two horizontal discs turning in opposite directions. The stream of slack or dust coal falling between these opening discs is shot upward through an opening into the fire-box.

By the use of this stoker, a fine shower of broken coal is continually spread over the entire surface of the grate-bars, and by governing the speed of the apparatus, the supply of fuel is regulated to suit the demand for steam. To prevent the fuel from caking into a mass of clinkers on the fire, every alternate grate-bar is given an up-and-down and two-and-fro motion, that gradually breaks up the clinkers, and forces them forward upon a balanced plate that may be upset by the fireman, and the waste dropped into the ash pit. The top of each bar is notched so as to cause the clinkers to catch and travel in one direction. All parts of the apparatus are outside of the fire-box, and there is no injury from heating and burning.

The valuable points claimed for this machine are freedom from cold currents over the fire, as there are no doors to be opened; freedom from smoke as the combustion is more perfect; and the use of small, inferior and slack coal—with the same steam results. Another result claimed is the increased comfort of the fire-room in point of temperature, as the fire door is kept constantly closed. On one steamship where this stoker was tried, the saving in cost of fuel was marked. The first voyage with hand-stoking lasted 53 days 13 hours under steam, with a consumption of 624 tons of coal, valued at £873 12s. The second voyage lasted 52 days 11 hours, and the consumption of fuel by the use of the mechanical stoker was 619 tons of slack and 87 tons of coal, at a total expense of £873 6s.

## MINE DRAINAGE.

The matter of mine drainage resolves itself into a three fold question of cost, convenience, and durability of the working conditions, whether permanent or temporary. It is believed that the drainage of mines would inevitably develop upon the simple, powerful and effective "Special" class. An illustration of a few examples of deep single lift engines, which had been placed in mines in most cases in pairs. A pair at Suffield Colliery, 24-inch steam cylinder, 7-inch pump cylinder, and 48 strokes per minute, raised each 10,000 gallons per hour in a single lift of 525 feet. A pair at Wigan, 30-inch steam cylinder, with 10-inch pump, at 48 strokes, raised each 20,000 gallons per hour 500 feet. Two at Newcastle, 32-inch cylinder, 7-inch pump, 72 strokes per minute, each raised 10,000 gallons per hour in a single lift of 1,068 feet. These were approximate statements of duty at 100 feet of piston speed per minute. At least 2,000 of these pumps are now at work in various British and foreign mines. The system of direct acting pumping engines was even more important, however, as affecting the drainage of new mining undertakings. For this purpose the "Special" pump was peculiarly fitted by its compact and complete character. One very important feature was that the direct acting steam pump of this type could be put down in pairs, while Cornish engines could not. Hence, whenever a mishap occurred, causing the stoppage of the engine, the whole of the pumping ceased, which, of course, was not the case when the engines were in duplicate.

## PETROLEUM AS FUEL.

Sainte-Claire Deville, experimenting for the French Government, found in oil from Oil Creek which will pretty fairly represent average American crude petroleum, a total calorific power of 9,963 centigrade units, equal to the evaporation of 16.16 lbs. of steam per pound of oil, and he was able practically to evaporate 14.05 lbs. with a pound of this petroleum. Now, a pound of pure, dry charcoal has a total theoretical heat of 7,990 units, and the oil thus has a greater evaporative power by just about 25 per cent. A gallon of petroleum weighs about 6½ pounds, so a gallon has the heating power of 8½ pounds of pure charcoal, and barrel of 42 gallons is equivalent to 350 lbs of such charcoal, and 6½ barrels of oil are equivalent to one long ton of charcoal.

Pure, dry charcoal, however, is hardly to be got except for chemical experiments, and the ordin-



ary charcoal of commerce has only about three-fourths as great heating power. Not being used to make steam, it need not be considered further.

The theoretical heating power of the best British coals is given as between 14 and 15 lbs. of steam per pound of coal, or nearly as great as that of petroleum: but the great advantage claimed for petroleum is the nearly complete utilization of its heating power, owing to its perfect and even composition, and the easy management of the heat arising from it. Thus the best practical results of the British Admiralty experiments with the best coal was the evaporation of 9.5 lbs. of steam per lb. of best coal, while Sainte-Claire Deville evaporated 14.05 lbs. with a pound of petroleum, and Professor Wurtz says, "with perfect combustion and skilled handling, we may safely adopt, as the actual steam value of our petroleum, fifteen pounds of water made into steam by one pound of oil." This is just 100 lbs. per gallon of oil.

By United States Navy experiments, Lackawanna Anthracite evaporated 9.8 lbs of water per lb. of coal; Cumberland Bituminous 9.44 lbs.; and Pittsburgh Bituminous (which is most likely to come into competition with petroleum) 8.2 lbs. On this basis:

1 gallon oil	= 10.2 lbs. Lackawanna.
	= 10.6 lbs. Cumberland.
	= 12.2 lbs. Pittsburgh.

and a long ton of

Lackawanna	= 219.6 gallons petroleum.
Cumberland	= 211.3 " "
Pittsburgh	= 188.6 " "

This, be it remembered, is the comparison of the actual effectiveness of the coals used in the navy experiments with the almost perfect utilization of the heating power which Professor Wurtz anticipates from the use of petroleum. Given the prices of coal and assuming the correctness of the statements made by the advocates of petroleum, it will be easy to ascertain which is the most economical fuel, where steam is made under advantageous circumstances. With the best coal above named, about five barrels of petroleum will take the place of a ton of coal, with the poorest, about 4½ barrels.

The claims of the advocates of petroleum, however, are not only placed on the practicability of the more complete utilization of the total heating power of the liquid fuel, but of its practicability under circumstances where coal is very imperfectly utilized. For instance, they claim that such complete, or nearly complete utilization is practicable in locomotives, where coal, we know, is not so effective as in furnaces with larger heating surface where the fire is less violently urged. One of the peculiarities claimed for petroleum is its availability for making an intense heat without waste, either by non-combustion of particles or the escape of a great part of the heat up the chimney. Further, the perfect combustion of petroleum, leaving neither coal nor cinders, is advanced as a recommendation of the fuel where these products of ordinary coal fires become a nuisance, as in most engines in cities and especially in locomotives designed for use in city streets.

All these comparisons, it must not be forgotten, are made on the assumption that a pound of crude petroleum will evaporate 15 pounds of water—will do the best work claimed for it by those who advocate its use; and the chief value of the figures given will be to show where petroleum cannot, rather than where it can be economical.

## COAL IN WESTERN KENTUCKY.

The coal field west of the Louisville and Nashville Railroad was first developed during the year 1872. The markets for the coal are Nashville, Tenn., and points on line of railroad from Evansville, Ind., to Nashville, Tenn. There are twelve veins of coal, ranging from two feet to eight feet in thickness. For steam purposes the coal rates at 99, Pittsburgh coal being a hundred. For gas purposes four feet to the pound is obtained, but there is more sulphur than in Pittsburgh coal.

## TEMPERING MINING PICKS.

There is probably no service to which steel can be put, which so effectually tests its value, as in mining picks. The tempering of a pick is a very nice piece of work and should be done with great care. In the first place a good charcoal fire is necessary; next, good steel, add then a good light hammer with a smooth-face anvil; and lastly a man is needed with a good keen eye, considerable experience and excellent judgement. No good pick can be turned out if any of the above essentials are wanting in the process. A pick should never be "upset," or hammered endwise, nor raised above a full red heat. The steel should be, moreover, heated as quickly as possible, as long exposure to heat—even if the heat is not in excess—injures its texture. Many blacksmiths find great difficulty in tempering picks, because they do not choose good steel. After being heated the pick must be

COAL IN NORTHUMBERLAND COUNTY, PA.

by the different operators in that region:		Tons.
Collieries.	Operators.	
Cameron	Mineral R. R. & M. Co.	27,209
Big Mountain	Patterson, L. & Co.	19,185
Buck Ridge	May, Audenried & Co.	110,237
Burnside	Isaac May & Co.	108,521
Luke Fidler	Mineral R. R. & Mining Co.	103,800
Bear Valley	A. A. Heim & Goodwill	91,977
Henry Clay	J. Langdon & Co.	85,943
Trevorton	P. & R. C. & I. Co.	76,320
Hickory Swamp	Mineral R. R. & Mining Co.	70,520
Enterprise	Enterprise Coal Co.	52,765
Monitor	G. W. Johns.	48,856
B. Franklin	Douty & Baumgarnder	46,905
Stuartville	Wm. Montellus.	44,694
Excelsior	Excelsior Mining Co.	43,463
Reliance	Reliance Coal Co.	38,922
Geo. Fales	A. A. Heim & Goodwill	32,577
Locust Spring	P. & R. C. I. Co.	31,750
Lancaster	Smith & Kelsor	24,954
Alaska Shaft	P. & R. C. & I. Co.	21,393
Morton	Thomas Morton	20,804
Greenback	Gulterman, Gorman & Co.	20,377
Hickory Ridge	Mineral R. R. & Mining Co.	18,940
Locust Gap	Graeber & Kemple	18,881
Helfenstein	P. & R. C. & I. Co.	15,975
Coal Ridge	Burton Bros. & Co.	12,412
Franklin	Lover, Booth & Elms.	10,668
Black Diamond	Schwenk & Co.	5,333
Marshall	Reese and Brother.	2,912
Royal Oak	Tillet & Brother.	800
Lambert	William Brown.	170

Total for 1875.....	1,628,683
Total for 1874.....	1,221,551
Increase in 1875.....	407,132

We publish the following estimate, showing a comparison of the working cost of certain English collieries in 1870 and 1874. It is said to have been made after a very careful examination of all available information:—

	£	s.	d.
Wages for one year for 299 collieries.....	1,664,999	14	3
Keep of 3040 horses, at 10s. 6d. per week for one year.....	82,542	0	0
Keep of 6386 ponies, at 6s. 6d. per week for one year.....	167,923	8	0
Hewers—23,500 tons, at 1s. per ton.....	1,175,000	0	0
"         do       "—        6d. "         "	587,500	0	0
Royalty—            "         "	97,916	13	4
Props and plates—23,500 tons at 1d. per ton.....			
Wear and tear—23,500 tons at 1d. per ton.....	97,916	13	4

Total expenses for 1870.....	3,814,248	8	11
Increase of expenses of 1874 over 1870.....	1,914,261	2	2
Add for sundry expenses that may be omitted.....	500, 00	0	0
	<u>£2,414,261</u>	<u>2</u>	<u>2</u>

£2,414,261 2 2

## WORKING COST FOR 1874.

	£.	S.	d.
Wages for one year for 209 collieries .....	2,380	949	11 9
Keep of 3040 horses, at 13s. per week for one year.....	102,752	0	0
Keep of 6386 ponies, at 8s. per week for one year.....	132,828	16	0
Hewers—23,500,000 tons, at 1s. 6½d. per ton.....	1,786,979	3	4
Royalty—23,500,000 tons, at 9d. per ton.....	881,250	0	0
Props and plates—23,500,000 tons at 1½d. per ton.....	146,875	0	0
Wear and tear—23,500,000 tons at 1½d. per ton.....	146,875	0	0
Workmen's coals—500,000 tons at 6s. per ton.....	150,000	0	0
Total expenses for 1874.....	5,798,509	11	0



# "THE COAL TRADE."

A COMPENDIUM OF VALUABLE INFORMATION

RELATIVE TO

**Coal Production, Prices, Transportation, etc., at  
Home and Abroad, with many Facts  
worthy of Preservation for  
Future Reference.**

*CORRECTED TO THE LATEST DATES.*

BY

**FREDERICK E. SAWARD.**

EDITOR OF THE "COAL TRADE JOURNAL."

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# THE COAL TRADE.

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## INTRODUCTION.

We present to the consideration of the public, facts and figures bearing upon the question of the quantity, price, and transportation of coal. In many instances the tonnages are brought down to the end of the year last past. We ask for the work a continuance of the cordial reception awarded the previous editions. To the many friends, at home and abroad, who have lent us their assistance, we return our sincere thanks.

In America, during the year there was a decreased production of Anthracite, and an increase in that of Bituminous coal; for details our readers are referred to the appropriate pages. Great Britain shows an increasing business for the period under review, as do most of the European countries. The United States is still the second coal producing country of the Globe, the output being say twenty million tons of Anthracite (including district consumption); Bituminous and Semi-Bituminous foots up twenty-seven millions, while Colorado, Wyoming, Utah and the Pacific Slope furnish one million tons of *Lignite* or Brown coal. Nova Scotia does not keep pace with the forward movement in coal production, noticeable in other localities. The grand total of the output in the Globe now amounts to something like two hundred and seventy million tons, of which Great Britain is accredited with over one half. Australia, India, China and Japan are together furnishing nearly three millions annually. Prussia, France, Belgium, Austria, Russia and Spain show an increased output.

## ANTHRACITE COAL.

Anthracite coal is found in an area of about 470 square miles, in Luzerne, Carbon, Schuylkill, Northumberland, Dauphin, and Columbia counties, in the State of Pennsylvania.

We append the following schedule of the production, prepared by Prof. P. W. Sheaffer, showing the amount of all the Anthracite coal marketed since the beginning of the industry in 1820, up to 1871.

1820.....	365 tons.
From 1820 to 1830.....	533,194 tons.
From 1830 to 1840.....	5,940,270 tons.
From 1840 to 1850.....	21,893,153 tons.
From 1850 to 1860.....	63,981,807 tons.
From 1860 to 1870.....	114,319,161 tons.
Total from 1820 to 1870 (50 years).....	206,666,325 tons.

From a table prepared by the late Mr. B. Bannan, for the same period, we reproduce the following interesting details :

SCHUYLKILL—Forwarded by Railroad.....	57,494,328 tons.
Forwarded by Canal.....	27,673,744 tons.
LEHIGH—Forwarded by Canal.....	25,490,037 tons.
Lehigh Valley Railroad.....	20,062,168 tons.
L. and S. Railroad.....	3,709,931 tons.
WYOMING—Lehigh Valley Railroad.....	5,914,006 tons.
Delaware and Hudson Canal Co.....	20,825,975 tons.
Pennsylvania Coal Co.....	13,164,550 tons.
Pennsylvania Canal.....	10,624,243 tons.
D. L. and W. Railroad.....	13,320,590 tons.
Lackawanna and Bloomsburg road.....	8,773,233 tons.
Lykens Valley and Short Mountain .....	2,677,398 tons.
Northumberland County (Shamokin) .....	6,758,588 tons.
Trevorton .....	1,017,196 tons.

There are three great divisions—which are named from their locations—the first or Southern, the second or Middle, and the third or Northern coal fields.

The Southern coal field lies principally in Schuylkill county, and hence it is often called the Schuylkill region.

The Mahanoy (often included in the Schuylkill) and Lehigh regions constitute the Middle coal field.

The Northern coal field is in Luzerne county, and embraces what is known as the Wyoming, Lackawanna, Scranton, and Wilkesbarre regions.

In addition to the production reported in our statistics, it is estimated that some 3,000,000 tons are annually consumed in the coal regions, by the engines, workmen, and local enterprises, the returns for which are not furnished.



## Production of the three coal fields for a series of years :

Year.	Schuylkill.	Wyoming.	Lehigh.	Total.
1864.....	2,642,218	3,960,836	2,054,669	10,177,475
1865.....	3,735,802	3,256,638	1,822,535	9,652,391
1866.....	4,633,487	3,736,616	2,128,867	12,703,882
1867.....	4,334,820	5,328,312	2,062,446	12,988,725
1868.....	4,414,356	5,990,813	2,507,582	13,834,126
1869.....	4,748,960	6,068,365	1,929,583	13,723,030
1870.....	3,720,403	7,599,902	3,040,303	15,849,899
1871.....	5,124,780	6,481,171	2,249,356	15,113,407
1872.....	5,106,451	9,194,808	3,610,674	19,026,125
1873.....	5,209,156	10,047,241	3,243,168	19,585,178
1874.....	5,891,666	9,445,446	4,404,000	18,980,726

## We append comparative details of the business of the last two years :

	1876.	1875.
LEHIGH : By Lehigh Valley Road.....	2,872,211	2,286,242
C. R. R. of N. J.....	1,467,937	1,111,715
D. & H. Branch of Pa.....	41,736	69,887
WYOMING : By Del. & Hudson Co.....	2,006,509	3,056,479
D. L. & W. R. R. Co.....	2,054,019	2,970,693
Pa. Coal Co.....	1,086,475	1,368,207
C. R. R. of N. J.....	1,422,279	1,549,930
Lehigh Valley R. R.....	964,100	936,921
Pa. & N. Y. R. R.....	26,862	88,246
Pa. Canal.....	407,522	299,267
SCHUYLKILL : By Philadelphia & Reading.....	4,935,401	4,780,693
Shamokin.....	587,274	788,034
Williamstown, etc.....	564,342	768,973

The Anthracite coal trade passed through a varied experience during the year 1876; in the early part dullness from the inability to market coal at the high prices made by the combination, in the summer months a continuance of this depression with much cutting in prices. In August the compact came to a sudden ending, prices were much lower, but a heavy tonnage was done during the ensuing three months, after which the trade was very dull, and unsatisfactory, with low rates, and small tonnage the order of the day. Coastwise freights ruled very low during the year, only appreciating to anything like paying prices, during the months of November and December. The rates of tolls, charged by carrying companies, during the year, conformed to the prevailing condition of trade, in so far as they advanced, as prices advanced, and did not recede until the break occurred in the autumn, so that the individuals who kept up mining, were compelled to pay a high rate of toll, while the prices were being cut, by parties working with the companies.

## LEHIGH VALLEY RAILROAD COMPANY.

Statement of the total coal tonnage, together with the tonnage east of Mauch Chunk, from the year 1855 to date:—

Coal tonnage east of			Coal tonnage east of		
Year.	Mauch Chunk.	Total Coal tonnage.	Year.	Mauch Chunk.	Total Coal tonnage
1855 (3 mo.).....	8,482	8,482	1866 .....	1,730,474	2,037,714
1856.....	165,740	165,740	1867.....	1,948,385	2,080,156
1857.....	418,235	418,235	1868.....	2,225,630	2,603,102
1858.....	471,029	471,029	1869.....	2,015,296	2,310,170
1859.....	577,651	577,651	1870.....	2,810,020	3,608,586
1860.....	730,641	730,641	1871.....	2,210,272	2,889,074
1861.....	743,671	743,671	1872.....	3,009,395	3,850,118
1862.....	882,573	882,573	1873.....	3,139,023	4,144,339
1863.....	1,195,154	1,195,154	1874.....	3,016,636	4,150,659
1864.....	1,295,419	1,466,794	1875.....	2,417,800	3,277,571
1865.....	1,402,276	1,687,462	1876.....	3,129,895	3,951,513

The year ends with Nov. 30th.

Details of the company's business for the year ending Dec 31, 1876, are as follows:—

From Wyoming Region.....	1,080,569 tons.
“ Hazleton Region .....	1,707,091 tons.
“ Upper Lehigh Region .....	2,371 tons.
“ Beaver Meadow Region .....	623,562 tons.
“ Mauch Chunk Region.....	22,256 tons.
“ Mahanoy Region.....	516,931 tons.

Total in tons of 2240 lbs ..... 3,952,780 tons.

## LEHIGH COAL AND NAVIGATION COMPANY.

Table showing the coal production and shipments of the company.

Year.	Tons.	Year.	Tons.
1820.....	365	1847.....	351,645
1821.....	1,073	1848.....	360,619
1822.....	2,440	1849.....	393,807
1823.....	5,823	1850.....	424,258
1824.....	9,541	1851.....	480,824
1825.....	28,393	1852.....	510,406
1826.....	31,280	1853.....	496,905
1827.....	27,770	1854.....	544,811
1828.....	33,150	1855.....	449,812
1829.....	25,110	1856.....	400,425
1830.....	43,000	1857.....	400,751
1831.....	44,500	1858.....	425,896
1832.....	77,292	1859.....	546,816
1833.....	124,508	1860.....	517,157
1834.....	106,500	1861.....	410,877
1835.....	131,250	1862.....	241,837
1836.....	146,738	1863.....	517,259

Year.	Tons.	Year.	Tons.
1837 .....	200,000	1864 .....	517,180
1838 .....	164,693	1865 .....	517,025
1839 .....	142,507	1866 .....	400,000
1840 .....	102,264	1867 .....	370,204
1841 .....	78,164	1868 .....	453,821
1842 .....	163,762	1869 .....	563,914
1843 .....	138,806	1870 .....	468,272
1844 .....	219,245	1871 .....	762,682
1845 .....	257,740	1872 .....	1,014,890
1846 .....	284,813	1873 .....	1,081,153

The business of this company for 1874, is merged into that of the Lehigh and Wilkesbarre Coal Co., which is its successor.

THE WILKESBARRE COAL AND IRON Co, began mining in 1869, merged into LEHIGH AND WILKESBARRE COAL Co., in 1874. The business is shown below :

Years.	Tons.	Years.	Tons.
1869 .....	502,485	1873 .....	1,278,307
1870 .....	799,226	1874 .....	2,479,382
1871 .....	950,754	1875 .....	2,085,038
1872 .....	1,168,716	1876 .....	2,381,572

The tonnage for 1876 was produced.

At Wilkesbarre mines .....	1,286,672 tons.
At Summit Hill mines .....	606,767 tons.
At Honey Brook mines .....	488,152 tons.

#### PHILADELPHIA AND READING R. R. CO.

We give the following table showing the business of the Philadelphia and Reading Railroad Co.,—tons of coal carried, gross receipts from coal transported, and the number of miles of main line open for business, in the various years from 1850 to 1877.

Date.	Tons.	Dollars.	Miles.
1850 .....	1,351,502	2,071,731	95
1851 .....	1,650,270	2,018,871	95
1852 .....	1,650,912	2,150,677	98
1853 .....	1,582,248	2,254,694	98
1854 .....	1,987,854	3,253,823	98
1855 .....	2,213,292	3,664,095	98
1856 .....	2,088,903	3,242,458	98
1857 .....	1,709,692	2,412,923	98
1858 .....	1,542,646	1,865,693	152
1859 .....	1,632,932	1,883,685	152
1860 .....	1,946,195	2,328,158	152
1861 .....	1,639,535	2,111,023	152
1862 .....	2,310,990	2,879,120	152
1863 .....	3,065,261	4,897,200	152



Date.	Tons.	Dollars.	Miles.
1864.....	3,065,577	7,203,775	152
1865.....	3,090,814	8,627,292	152
1866.....	3,714,684	8,245,697	152
1867.....	3,446,826	6,404,878	152
1868.....	4,574,874	6,252,224	152
1869.....	4,239,457	8,346,240	152
1870.....	4,633,504	6,498,871	152
1871.....	6,002,573	8,287,293	260
1872.....	6,185,434	7,513,115	323
1873.....	6,546,553	9,104,094	327
1874.....	6,348,812	8,920,914	327
1875.....	5,505,455	7,636,699	327
1876.....	5,595,207	6,708,682	327

[The year ends with November 30, in all cases.]

Coal produced from the lands owned by the company during 1873-76, divided into that produced by the Philadelphia and Reading Coal and Iron Co., and that produced from lands of the company, leased to individual operators.

Year.	Leases produced.	P. & R. C. & I. Co. produced.	Average cost at mines.
1873.....	2,055,565 tons.	1,348,838 tons.	\$2.51 per ton.
1874.....	1,802,370 tons.	1,374,790 tons.	2.45 per ton.
1875.....	1,594,741 tons.	1,510,572 tons.	1.87 per ton.
1876.....	1,218,533 tons.	1,853,364 tons.	1.35 per ton.

*The ton used is that of 2240 lbs.—The figures for 1876 are for eleven months of that year, to Nov. 30th, as per the company's statement.*

Details of the company's business for their fiscal year, ending November 30th, 1876 :

	Paying Freight.	For Company's Use.
Received at Port Carbon.....	1,357,553 17 tons.	123,624 08 tons.
Received at Mount Carbon.....	101,410 06 tons.	9,835 11 tons.
Received at Schuylkill Haven.....	1,253,266 12 tons.	126,339 13 tons.
Received at Pine Grove.....	358,102 19 tons.	6,339 11 tons.
Received at Tamaqua.....	528,920 04 tons.	45,771 04 tons.
Wyoming and Lehigh coal.....	539,930 19 tons.	.....
Bituminous coal.....	164,306 00 tons.	7,514 16 tons.
Carried by Canal.....	653,379 13 tons.	.....
Shipped Westward.....	203,670 00 tons.	18,719 04 tons.
Consumed on Laterals.....	96,521 17 tons.	.....

Total tonnage for the year..... 5,257,062 07 tons. 338,144 07 tons.

The coal forwarded to market during the fourteen years last past was distributed as follows :

Years.	Line.	Philadelphia.	Port Richmond.
1863.....	548,755 tons.	388,352 tons.	2,128,154 tons.
1864.....	634,074 tons.	373,070 tons.	2,058,423 tons.

Years.	Line.	Philadelphia.	Port Richmond.
1865.....	659,376 tons.	380,283 tons.	2,051,202 tons.
1866.....	836,598 tons.	475,189 tons.	2,402,897 tons.
1867.....	935,694 tons.	386,933 tons.	2,121,189 tons.
1868.....	597,903 tons.	697,277 tons.	2,113,581 tons.
1869.....	923,504 tons.	888,633 tons.	2,362,972 tons.
1870.....	1,074,400 tons.	785,535 tons.	1,893,055 tons.
1871.....	1,128,227 tons.	923,539 tons.	2,311,393 tons.
1872.....	1,357,208 tons.	998,212 tons.	2,223,137 tons.
1873.....	1,670,183 tons.	1,075,255 tons.	2,266,892 tons.
1874.....	1,715,052 tons.	1,064,304 tons.	2,076,259 tons.
1875.....	1,197,449 tons.	923 850 tons.	1,713,978 tons.
1876.....	1,444,780 tons.	914,881 tons.	1,770,523 tons.

## DELAWARE AND HUDSON CANAL CO.

This company began mining and carrying coal in 1829—The following table shows the tonnage since the commencement :

Years.	Tons.	Years.	Tons.
1829.....	7,000	1871.....	1,366,471
1830 to 1839.....	846,330	1872.....	2,930,761
1840 to 1849.....	2,897,881	1873.....	2,752,595
1850 to 1859.....	4,838,855	1874.....	2,399,417
1860 to 1869.....	10,098,661	1875.....	3,053,817
1870.....	2,039,722	1876.....	1,997,545

Tons are stated at 2240 lbs.

## LEHIGH AND SUSQUEHANNA RAILROAD

Now operated by the

## CENTRAL RAILROAD OF NEW JERSEY.

Amount of coal carried over the Lehigh and Susquehanna Railroad since its opening :

Year 1868.....	1,058,054 tons.
Year 1869.....	1,297,825 tons.
Year 1870.....	1,354,052 tons.
Year 1871.....	1,033,587 tons.
Year 1872.....	2,527,068 tons.
Year 1873.....	3,089,697 tons.
Year 1874.....	2,972,286 tons.
Year 1875.....	2,661,635 tons.
Year 1876.....	2,952,520 tons.

[Tons of 2240 lbs.]

A schedule of prices offers, at times, a fair reflex of the condition of business, and this exceptional remark must be kept in view, to make the following table of value.

We have selected the prices of the Lehigh Coal Exchange for their coal, f. o. b. at shipping points; and the Wilkesbarre Coal of the Lehigh and Wilkesbarre Coal Co., f. o. b., as indicative of the market values. We also give the rates obtained at the auction sale of the 29th of August.

*Prices of Anthracite during 1876.*

	Lump.	Grate.	Egg.	Stove.	Chestnut.	
January — Lehigh.....	\$5 55	\$5 55	\$5 65	\$6 10	\$5 10	
Wilkesbarre.....	5 05	5 25	5 65	6 00	4 95	
February—Lehigh.....	5 25	4 90	5 00	5 50	4 85	
Wilkesbarre.....	4 65	4 75	4 95	5 50	4 70	
March — Lehigh.....	4 90	4 70	4 70	5 30	4 60	
Wilkesbarre.....	4 60	4 80	4 90	5 50	4 70	
April — Lehigh.....	4 90	4 70	4 70	5 30	4 60	
Wilkesbarre.....	4 60	4 80	4 90	5 50	4 70	
May — Lehigh.....	4 95	4 75	4 75	5 35	4 65	
Wilkesbarre.....	4 65	4 85	4 95	5 55	4 75	
June — Lehigh.....	5 00	4 80	4 80	5 40	4 70	
Wilkesbarre.....	4 70	4 90	5 00	5 60	4 80	
July — Lehigh.....	5 05	4 85	4 85	5 45	4 75	
Wilkesbarre.....	4 75	4 95	5 05	5 65	4 95	
August — Lehigh.....	5 20	5 00	5 00	5 60	4 90	
Wilkesbarre.....	4 90	5 10	5 20	5 80	5 00	
Auction Prices	Pennsylvania Coal Co.....	2 72½	2 68½	2 87½	3 68¾	3 26¼
	Delaware and Hudson Co..	2 76½	3 35	3 18½	3 85	.....
	Del. Lack. & West'n R. R.	2 77½	2 72½	2 78	3 60½	2 77½
	Philadelphia and Reading.	2 11½	2 66½	2 20½	2 71½	1 98½
September—Lehigh.....	4 00	3 50	3 60	4 00	3 30	
Wilkesbarre.....	3 25	3 50	3 50	4 00	3 30	
October — Lehigh.....	4 00	3 60	3 60	4 00	3 30	
Wilkesbarre.....	3 25	3 50	3 50	4 25	3 50	
November—Lehigh.....	4 00	3 60	3 60	4 00	3 60	
Wilkesbarre.....	3 25	3 50	3 50	4 25	3 60	
December — Lehigh.....	3 75	3 25	3 25	3 75	3 50	
Wilkesbarre.....	3 00	3 00	3 00	3 75	3 25	

We give below prices for Schuylkill White Ash Lump Coal, on board vessels at Philadelphia, from 1834 to 1875. inclusive; prepared originally by W. G. Neilson, and continued by I. W. Morris, Jr.—being the average rates obtained from sales made during the year :

Years.	Prices.	Years.	Prices.
1834.....	\$4 84	1845.....	\$3 46
1835.....	4 84	1846.....	3 90
1836.....	6 64	1847.....	3 80
1837.....	6 72	1848.....	3 50
1838.....	5 27	1849.....	3 62
1839.....	5 00	1850.....	3 64
1840.....	4 91	1851.....	3 34
1841.....	5 79	1852.....	3 46
1842.....	4 18	1853.....	3 70
1843.....	3 27	1854.....	5 19
1844.....	*3 20	1855.....	4 49

\*Lowest point.



1856.....	\$4 11	1866.....	\$5 80
1857.....	3 87	1867.....	4 37
1858.....	3 43	1868.....	3 86
1859.....	3 25	1869.....	5 31
1860.....	3 40	1870.....	4 39
1861.....	3 39	1871.....	4 46
1862.....	4 14	1872.....	3 74
1863.....	6 06	1873.....	4 27
1864.....	† 8 39	1874.....	4 55
1865.....	7 86	1875.....	4 39

† Highest point.

#### DELAWARE, LACKAWANNA & WESTERN R. R. CO.

The coal business of this Company, which began in 1854, has been as below:—

Year.	Tons.	Year.	Tons.
1854.....	133,965	1866.....	1,519,538
1855.....	187,000	1867.....	1,719,321
1856.....	305,530	1868.....	1,728,785
1857.....	490,023	1869.....	1,563,928
1858.....	683,411	1870.....	2,348,097
1859.....	829,435	1871.....	1,916,486
1860.....	1,080,227	1872.....	2,836,948
1861.....	1,104,319	1873.....	3,136,306
1862.....	1,094,315	1874.....	2,570,437
1863.....	1,223,165	1875.....	3,326,901
1864.....	1,302,457	1876.....	2,300,500
1865.....	1,007,074		

Tons are stated at 2000 lbs. per ton.

#### PENNSYLVANIA COAL CO.

The tonnage produced, by this Company since 1850, has been as below:—

Year.	Tons.	Year.	Tons.
1850.....	111,014	1864.....	759,544
1851.....	316,017	1865.....	577,494
1852.....	426,164	1866.....	535,385
1853.....	512,659	1867.....	861,730
1854.....	496,648	1868.....	953,855
1855.....	504,803	1869.....	966,637
1856.....	612,500	1870.....	1,086,008
1857.....	536,008	1871.....	802,039
1858.....	630,056	1872.....	1,213,478
1859.....	688,854	1873.....	1,239,214
1860.....	701,523	1874.....	1,338,663
1861.....	629,657	1875.....	1,368,207
1862.....	601,091	1876.....	1,086,475
1863.....	662,904		

Tons are stated at 2240 lbs.

As an indication of the rise and fall of prices, prior to, during, and after the collapse of the combination, we append the following prices, being those of Lehigh and Wilkesbarre Coal Co., for their "Wilkesbarre" coal; prepared expressly for this work.

1872.											
	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov. Dec.
Lump.....	4 00	3 75	3 75	3 75	3 75	3 75	3 75	3 75	3 60	4 00	4 00
Broken.....	4 40	3 85	3 85	3 85	3 85	3 85	3 85	3 85	3 85	4 35	4 40
Egg.....	4 50	3 85	3 85	3 85	3 85	3 85	3 85	3 85	3 85	4 35	4 50
Stove.....	5 25	4 25	4 25	4 35	4 35	4 25	4 25	4 25	4 10	4 60	5 00
Chestnut.....	4 25	3 75	3 75	3 80	3 80	3 80	3 80	3 80	3 60	4 10	4 00
1873.											
	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov. Dec.
Lump.....	4 25	4 45	4 45	4 45	4 55	4 65	4 75	4 85	4 95	5 05	5 05
Broken.....	4 45	4 65	4 65	4 65	4 75	4 85	4 95	5 05	5 15	5 25	5 25
Egg.....	4 70	4 90	4 90	4 80	4 90	5 00	5 10	5 20	5 30	5 40	5 40
Stove.....	5 15	5 35	5 35	5 00	5 10	5 20	5 30	5 40	5 50	5 60	5 70
Chestnut.....	4 35	4 45	4 45	4 45	4 55	4 65	4 75	4 85	4 95	5 05	5 05
1874.											
	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov. Dec.
Lump.....	5 05	5 05	4 55	4 60	4 70	4 80	4 95	5 10	5 25	5 40	5 55
Broken.....	5 25	5 25	4 75	4 80	4 90	5 00	5 15	5 30	5 45	5 60	5 75
Egg.....	5 40	5 40	4 90	4 95	5 05	5 15	5 30	5 45	5 60	5 75	5 90
Stove.....	5 70	5 70	5 35	5 40	5 50	5 65	5 80	5 95	6 10	6 25	6 40
Chestnut.....	5 05	5 05	4 35	4 40	4 50	4 60	4 75	4 90	5 05	5 20	5 35
1875.											
	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov. Dec.
Lump.....	5 55	5 55	4 40	4 60	4 80	4 90	5 00	5 00	5 05	5 05	5 05
Broken.....	5 75	5 75	4 60	4 80	5 00	5 10	5 20	5 20	5 25	5 25	5 25
Egg.....	5 90	5 90	4 75	4 95	5 15	5 25	5 35	5 45	5 55	5 65	5 65
Stove.....	6 40	6 40	5 30	5 40	5 60	5 70	5 80	5 90	6 00	6 10	6 10
Chestnut.....	5 35	5 35	4 35	4 40	4 60	4 70	4 80	4 90	4 95	4 95	4 95

## PENNSYLVANIA.

## NORTHERN PENNSYLVANIA SEMI-BITUMINOUS COAL FIELD.

The first coal from the Blossburg district, in this coal field, was sent to market from the "Bloss" mines in 1840. The producers are the Fall Brook Coal Company, and Blossburg Coal Company, with mines near Blossburg, Tioga county, Pa. Seventy five miles of railway, carries the coal from the mines to Seneca Lake, in New York State, where it is received into canal boats which deliver it by the canal system of water ways, throughout the State. The railway from the mines connects with the Erie Railway at Corning, N. Y., affording additional outlets to market, by the railways of the State and their connections, for the coal from this region; it being shipped as far west as Salt Lake City.

The most important seam is that known as the Bloss vein, a clean bed of pure coal, from  $4\frac{1}{2}$  to  $5\frac{1}{2}$  feet in thickness.

Statistics of the output are shown in the following schedule :

Year.	Tons.	Year.	Tons.
1840.....	4,235	1858.....	41,894
1841.....	25,966	1859.....	48,393
1842.....	13,164	1860.....	76,918
1843.....	6,268	1861.....	112,712
1844.....	14,234	1862.....	179,334
1845.....	29,836	1863.....	235,843
1846.....	16,509	1864.....	384,977
1847.....	29,807	1865.....	394,642
1848.....	33,763	1866.....	411,759
1849.....	32,095	1867.....	481,318
1850.....	23,161	1868.....	602,328
1851.....	25,000	1869.....	715,094
1852.....	20,000	1870.....	733,035
1853.....	45,507	1871.....	815,079
1854.....	70,214	1872.....	849,262
1855.....	73,204	1873.....	991,057
1856.....	70,669	1874.....	796,388
1857.....	94,314	1875.....	581,782
1876.....	616,984		

The Barclay district is located in Bradford county, Pa., some 36 miles south from Waverly, N. Y. The mines are owned by the Fall Creek Bituminous Coal Co., the Erie Railway Co., (comprising the lands formerly of the Barclay) the Towanda Coal Co., and the Schrader Coal Co.

The table which we give on the next page shows the amount of coal shipped from the Barclay Coal Region, by the several companies which have operated it.



Year.	Barclay Coal Co.	Towanda Coal Co.	Fall Creek Coal Co.	Total Products.
1856.....	2,295	—	—	2,295
1857.....	6,265	—	—	6,265
1858.....	17,560	—	—	17,560
1859.....	30,143	—	—	30,143
1860.....	27,718	—	—	27,718
1861.....	40,835	—	—	40,835
1862.....	52,779	—	—	52,779
1863.....	54,535	—	—	54,535
1864.....	62,058	—	—	62,058
1865.....	48,375	7,886	16,936	73,197
1866.....	37,968	31,881	29,604	99,453
1867.....	30,119	27,668	16,953	74,739
1868.....	—	67,080	6,595	73,675
1869.....	—	176,307	4,303	180,610
1870.....	—	196,310	77,025	273,335
1871.....	—	249,240	129,095	378,335
1872.....	Schrader	203,960	118,882	382,842
1873.....	Coal Co.	252,329	85,315	337,644
1874.....	100,219	215,572	21,281	337,072
1875.....	157,686	200,424	18,507	376,637
1876.....	200,795	160,343	—	361,138

The Towanda for 1876 is for the fiscal year ending November 30.

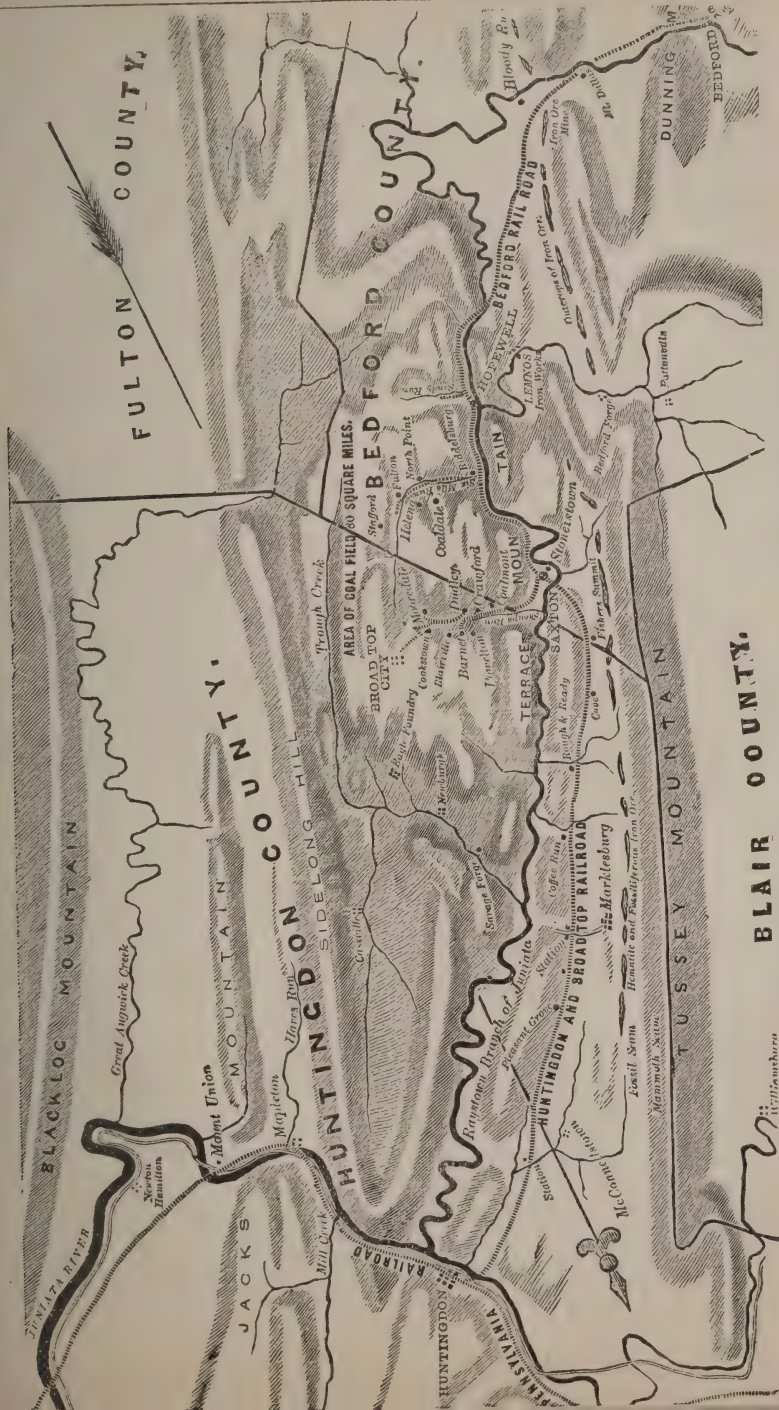
The McInyre Coal Co., whose mines are at Ralston, Pa., on the Northern Central Railway (54 miles south from Elmira, N. Y.,) which gives them an outlet both north and south to a market, commenced operations in 1870. Statistics of their business are as below :

Year.	Tons.	Year.	Tons.
1870.....	17,802	1874.....	138,907
1871.....	106,138	1875.....	164,507
1872.....	171,420	1876.....	208,701
1873.....	212,462		

Since the opening of the mines of the Blossburg district, in 1840, the shipments by each company have been as follows :

Arbon Coal Company, 1840-1843.....	49,633 net tons.
Wm. M. Mallory, 1844-1857.....	405,113 net tons.
D. S. Magee, 1856-59.....	78,996 net tons.
Tioga Transportation Company.....	323,174 net tons.
Salt Company of Onondaga, 1863-1866.....	267,809 net tons.
Morris Run Coal Company, 1864-1876.....	3,538,385 net tons.
Fall Brook Coal Company, 1860-1876.....	3,164,105 net tons.
Blossburg Coal Company, 1866-1876.....	1,806,283 net tons.

Total production of the district..... 9,683,501 net tons.



MAP OF THE BROAD TOP COAL AND IRON REGION.

## BROAD TOP SEMI-BITUMINOUS COAL FIELD.

The area of this coal field is stated at eighty square miles, and the aggregate thickness of workable coal seams is 26 feet, the larger seams range from five to ten feet in thickness, and the lesser from one to three.

An outlet for the coal from this region is afforded by the Huntingdon and Broad Top Mountain Railroad (this was completed in 1856, and during the latter part of that year 42,000 tons were forwarded from this region to various markets.) This line extends from the town of Huntingdon, on the Pennsylvania Railroad, 203 miles west of Philadelphia, to Mt. Dallas in Bedford county, a distance of 45 miles. At Saxton, 24 miles from Huntingdon, a branch road, 10 miles in length, extends to Broad Top City; at Riddlesburg, 5 miles beyond Saxton, is another branch in to Fulton, 5 miles from the main road.

From Mt. Dallas the Bedford and Bridgeport Railroad, 38<sup>6-10</sup> miles in length, extends to the Maryland State line; from this point to Cumberland, Md., via the Cumberland and Piedmont Railroad, is 7 miles. This connection gives an outlet to the Cumberland coal to the interior markets of Pennsylvania, to Philadelphia and South Amboy, N. J. The Bedford and Bridgeport road is leased to the Pennsylvania Railroad and operated by them.

The yearly shipments from this region, by the H. & B. T. R. R., have been as follows:

Year.	Tons.	Year.	Tons.
1856.....	42,000	1866.....	265,720
1857.....	78,813	1867.....	244,412
1858.....	105,478	1868.....	280,936
1859.....	130,595	1869.....	360,778
1860.....	186,903	1870.....	313,425
1861.....	272,625	1871.....	319,625
1862.....	333,606	1872.....	297,473
1863.....	305,678	1873.....	350,245
1864.....	386,645	1874.....	226,693
1865.....	315,906	1875.....	204,921
1876.....	159,779		

The East Broad Top Railroad penetrated this coal field in 1875, and carried 53,567 tons of coal during that year, and 66,104 in 1876.

The shipments of Cumberland coal over the Pennsylvania State line, and H. & B. T. R. R. have been as below:

Year.	Tons.	Year.	Tons.
1872.....	22,021	1874.....	67,671
1873.....	114,589	1875.....	175,154
1876.....	145,796		



## SNOW SHOE SEMI-BITUMINOUS COAL FIELD.

This region is located in Centre county, Pennsylvania. It covers an area of about eight miles in length, and some four miles in breadth, and is situated on both sides of Beach Creek. The coal finds an outlet to market, via the Bellefonte and Snowshoe, and Bald Eagle Valley connections of the Pennsylvania Railroad; it being 47 miles from Snowshoe to Tyrone, on the main line.

There is but one company mining in this district. It commenced operations in the year 1862, with 8,260 tons, and has increased as below :

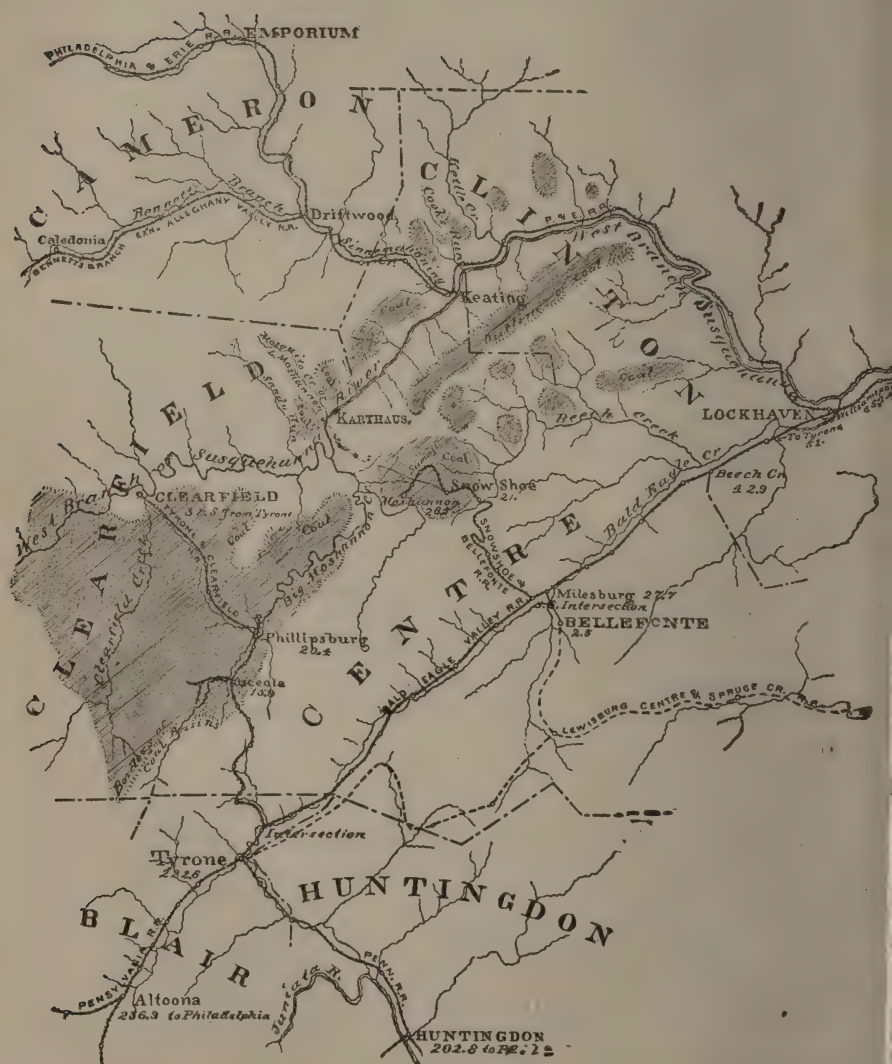
Year.	Tons.	Year.	Tons.
1862.....	8,260	1869.....	89,356
1863.....	12,039	1870.....	85,276
1864.....	33,593	1871.....	79,984
1865.....	51,881	1872.....	68,988
1866.....	70,890	1873.....	95,257
1867.....	58,137	1874.....	63,540
1868.....	60,149	1875.....	62,426
1876.....	51,399		

Prof Rogers gives this Snowshoe coal 78.8 of Fixed Carbon, and 21.2 of Volatile Matter and Ashes.

## CLEARFIELD REGION.

This coal field is located in Clearfield and Centre counties, in the central part on of the State of Pennsylvania; for an outlet for the products of its mines it is dependent upon the Tyrone and Clearfield branch of the Pennsylvania Railroad, extending from Tyrone on the main line, (224 miles west from Philadelphia,) to Clearfield, 41 miles. The Pennsylvania Railroad Company own the railroads, the shipping wharves, and all the means of access to the markets of the Atlantic seaboard; the advantage of being connected with a railroad of such magnitude, with its wonderful ramifications and connections, gives the coal proprietors of this region great facilities for the proper conduct of their business, and it is owing to the very liberal policy of this corporation, that the district has been enabled to take the rank which it has assumed, in connection with the fuel supply of the seaboard. The figures given of the production, show that the market for this quality of coal has steadily increased while other districts fell off; its introduction at New York and the East, has been most successful during the year last past.

The coal is used for steam purposes under stationary, marine, or locomotive engines, for making iron and steel rails, for glass works, in lime kilns, and for many other purposes, being much liked wherever used; ignites freely, burns readily, and leaves a white ash. It is not easily friable, and bears transportation remarkably well.



MAP OF THE CLEARFIELD REGION.

The first actual business in quantity from this coal field was in 1862, the returns have not been carefully kept for the first few years. but from that date until the year 1870, the business is returned to us by the Pennsylvania company at some 696,377 tons forwarded over its line to market.

The coal measures are found to be admirably adapted for working, dipping gently toward the Moshannon Creek, which flows through the centre of the basin. The lowest seam of coal (A), five feet thick, crops out on the level of this stream. The next (B), sixty feet above, is three to four feet in thickness. Fifty feet above is another seam (C), ranging from two to three and a half feet in thickness. Again, fifty feet above, is found a seam (D) of five feet of good solid coal.

Analyses of coal from this district made by the State Geological Survey of 1875, gave :

NAME OF COLLIERY	Water.	Volatile matter.	Fixed carbon.	Sulphur.	Ash.
<i>Clearfield County.</i>					
1. Penn Colliery .....	.810	20.640	74.023	.507	4.020
2. Franklin Colliery .....	.670	21.360	74.284	.435	3.251
3. Eureka Mine .....	.780	21.680	73.052	.688	3.800
4. Stirling Mine .....	.710	23.400	72.218	.532	3.140
5. Moshannon Colliery .....	.765	20.090	74.779	.666	3.700
6. New Moshannon Mine .....	1.100	23.070	71.199	.611	4.030
7. Hale's Colliery. Upper bed .....	.570	24.630	68.400	1.900	4.500
8. Hale's Colliery. Lower bed .....	.740	25.210	68.628	2.122	3.800
9. Mapleton Colliery .....	.700	23.585	68.890	1.715	5.130
10. Logan Colliery .....	.620	22.135	68.728	.567	7.650
11. Laurel Run Colliery .....	.800	23.260	72.350	.590	3.000
12. Decatur Coal Co.'s Colliery. Lower bench .....	.640	24.360	64.082	3.378	7.540
13. Decatur Coal Co.'s Colliery. Upper bench .....	.820	23.900	69.007	1.373	4.900
14. Morrisdale Mine. Lower bench .....	.550	24.090	71.689	.571	3.100
15. Morrisdale Mine. Upper bench .....	.569	25.190	71.013	.587	2.650
16. Derby Colliery .....	.410	22.810	66.690	1.790	8.300
17. Reitur's Colliery. Upper bed .....	.630	24.030	70.396	.654	3.690
18. Mon's Mine .....	.750	19.570	69.833	.677	9.170
19. Hill's Mine .....	.380	22.250	67.995	2.455	6.890
20. Humphrey's Mine .....	.410	21.800	72.903	1.087	3.800
21. Mason's Mine. Upper bench .....	.550	22.650	72.616	1.334	2.856
22. Mason's Mine. Lower bench .....	.480	22.320	69.788	4.232	13.180
23. G. W. Davis' Mine .....	.640	23.010	71.799	.551	4.000
24. Jeremiah Cooper's Mine .....	.700	24.020	64.951	1.639	8.690
25. Williamson's Mine .....	.620	22.730	68.784	1.576	6.280
26. Powelton Mine. Lower part of bed .....	.600	22.600	68.709	2.691	5.400
27. Powelton Mine. Upper part of bed .....	.540	22.560	71.551	1.079	4.270
28. Webster's Colliery .....	1.630	22.000	72.815	.425	3.130
29. Bell's Mine .....	.950	22.450	59.904	1.296	5.400
30. Tyler's Mine .....	.940	31.060	61.563	1.487	4.950
31. R. Shaw's Mine .....	.870	21.680	68.928	1.302	7.220
32. J. Shaw's Mine .....	.520	21.080	67.133	.767	10.550
33. Mongold's Mine .....	.860	31.600	61.662	2.228	3.590
34. Hubler's Mine .....	.420	25.010	67.221	2.479	4.870
35. Beaver Run .....	.920	21.550	74.009	.631	2.890
<i>Centre County.</i>					
1. Snow Shoe Mines. Upper bed. Mine No. 5.....	1.280	25.580	68.937	.613	3.590
2. Snow Shoe Mines. Middle bed. Mine No. 6.....	.650	24.560	70.416	.964	3.410
3. Snow Shoe Mines. Lower bed (B). Mine No. 4....	.750	23.440	64.374	.986	10.450
4. Wm. Holt's Mine, west of Holt's Hill.....	.880	23.629	70.089	.661	4.750
5. Wm. Holt's Mine. Snow Shoe basin. Upper b'n.....	1.680	21.870	71.103	.612	4.734

The rate of wages paid in this coal field have been during 1876, only some forty or forty-five cents per ton for the digging of the coal ; this is lower than in competing regions, and is one of the causes, in connection with the favorable arrangements made with the carrying company, that has enabled the region to hold its own in the matter of product.



We give below statistics of the product from the beginning :

In the years 1862--1870.....	696,877 tons.
In the year 1870.....	410,523 tons.
In the year 1871.....	542,896 tons.
In the year 1872 .....	431,915 tons.
In the year 1873.....	592,860 tons.
In the year 1874.....	639,630 tons.
In the year 1875.....	928,297 tons.
In the year 1876.....	1,281,861 tons.
Making a total of (in tons of 2,000 lbs.).....	5,534,359 tons.

#### MYER'S MILLS OR SALISBURY REGION.

This district is located in Somerset county, Pennsylvania, adjoining the Cumberland region of Maryland, and the coal is stated to be similar to, and an extension of the Cumberland coal basin. The coal is of the same quality and will yield an equal quantity per acre. It is eleven miles from Frostburg, Md., and the coal finds an outlet to Baltimore and the seaboard markets over the Pittsburgh and Connellsville branch of the B. & O. R. R. The Keystone Coal Co., have been at work here since 1872, and have already built up a business ranging from 250 to 600 tons per day, according to the season; the property of the company is advantageously situated for the shipment of its production, and the rate of transportation from the mines to market is very favorable. The Cumberland and Elk Lick Coal Co. own 1,500 acres of land in this district, and have been doing a good business, having sent to market in the year last past some 39,919 tons.

Myers mills, which may be stated as the centre of the district, is 217 miles from Baltimore, and 112 miles from Pittsburgh, by present routes.

The first coal seam rests on a thin floor of fire clay. The coal bed has two benches; the lower, 18 inches thick, is an impure cannel coal circling to block structure; the upper is a medium quality of semi-bituminous coal with the well marked columnar structure peculiar to Allegheny coals.

The interval between this and the next small coal seam is composed of thin plates of sandstones with olive-colored shales.

The second workable seam (B) is pre eminently *the bed* of the lower system of coal measures; not perhaps, so much from its size and good quality of coal, as from its ready and sure identification, wherever it exists, by the massive bed of limestone on which it rests. The farmers trace it from hill-side to hillside, regarding it with peculiar affection as a *double gift*—not only supplying fuel for domestic use, but also with lime to enrich the “glades” in their mountain farms.

The coal in this bed is columnar in structure with plates of mineral charcoal disseminated. In structure and quality it is closely associated with

the best Clearfield coal. It will be found a superior fuel for iron working.

The third seam (C) is all pure coal of an excellent quality; but as the bed is high in the measures and does not occupy a wide area in this portion of the field, it has as yet received little attention.

From seam B to the top of the scale, the measures are composed of very soft flesh and olive colored shales, which have been rounded and softened into easy rolling slopes and rounded hills.

#### WESTMORELAND REGION.

The celebrated Penn and Westmoreland Gas Coal is mined near Penn and Irwin stations, on the Pennsylvania Railroad, in Westmoreland county; the distance from Philadelphia is 332 miles. The coal mined is the great Pittsburgh bed of Bituminous coal; the companies operating in this region are large and influential, among them being the Penn Gas Coal Co., and the Westmoreland Gas Coal Co.; the region does a business of about a million tons annually; the coal is used in every seaboard city for gas purposes, and always commands the highest price, in fact it makes the rate for all other gas producing coal that reaches the seaboard. The shipping points are South Amboy, N. J., and Greenwich, on the Delaware river, below Philadelphia. The shipments from this region for 1874 were 952,971 tons, for 1875, 769,968 tons, for 1876, 902,139 tons coal and 60,094 tons coke.

This coal is in great favor among gas engineers in the United States.

In the dry way, by the ordinary process, the Westmoreland coal yields on an average sample as follows:

Charge, 224 pounds, carbonized 3 h. 20 m., produced per ton.....	9,500 cubic ft.
Illuminating power, standard Argand.....	16.52 candles.
Weight of coke, per ton.....	1,544 pounds.
Bushels of coke, per ton.....	40
Maximum yield of gas per ton.....	10 642 cubic ft.
One bushel of lime purified.....	6,420 cubic ft.

#### Analysis of the coal:

Volatile matter.....	36 per cent.
Fixed carbon.....	58 per cent.
Ash.....	6 per cent.

100

Value of the gas from one ton estimated in pounds of spermacetti.....541.26 pounds.

The above results were obtained in the experimental works of the Manhattan Gas Light Company, New York, where the daily average yield of gas from this coal and its equivalent, the "Penn," is about 10,000 cubic feet of seventeen candle gas.

#### SONMAN REGION.

This coal district lies in Cambria county, the coal is worked in the same

vein that is mined in Clearfield county; the coal here has a heavier cover than where found in the adjoining county of Clearfield; is strong, and partakes somewhat of the nature of the gas coal found in Westmoreland county, which adjoins it on the south-west; the trade has largely increased during the past three years, shipments having been made to all tide-water ports, to New England, Baltimore, Chicago, Cleveland, etc., at the west, and along the line of the Pennsylvania Railroad; it has not only maintained its place, but gained in favor. Messrs. Dysart & Co., are the owners and proprietors of the coal lands in this district, and the business has been developed to large proportions through their enterprise.

An analysis made of Sonman Vein White Ash Coal by Dr. C. M. Cresson, gave the following results, as compared with Broad Top and Westmoreland:

	Sonman.	Broad Top.	Westmoreland.
Volatile matter.....	18.30	17.85	32.85
Fixed Carbon.....	78.60	74.65	61.45
Ash.....	2.70	7.50	5.80
Sulphur.....	0.40	1.85	1.04

The ash consists of Alumina, Silica and Lime. Does not produce clinker. The yield of coke showed 82.30 per cent.; taking the "Penn" coal at 1000 as the standard for steam purposes, Sonman coal is equivalent to 959.

#### MERCER COUNTY, PENNSYLVANIA.

The most important coal region in North-west Pennsylvania (running over into Eastern Ohio), is that of Mercer county. The coal produced is what is known as the splint or block coal, and is used in the raw state for smelting iron; the principal location of this peculiar coal is on the Erie and Pittsburgh Railroad, about 75 miles south from Erie, Pa. The product finds an outlet to market by this route, and the Beaver and Erie canal. The beds vary from two to five feet in thickness, and some six hundred thousand tons are annually produced, the figures for 1873 aggregating 529,496 net tons.

#### WEST BRANCH REGION.

The Philadelphia and Erie Railroad runs across the northern ends of five coal basins. There is no important development of the first two. In the third, at 67 miles west of Williamsport, is the Wistar Mountain Co's mines; at 97 miles, are the works of the Cameron Coal Co. In the fourth, at 117 miles, is St. Mary's; at 125 miles, Benzinger's; at 128 miles, the Shawmut branch road comes in. In the fifth, at 138 miles, are the Johnsonburg mines. The completion of the Buffalo, New York, and Philadelphia



Railroad gives the coal from these basins an outlet to an additional market; and during 1875, some 63,348 tons coal were carried by this road. The Philadelphia and Erie road carried in 1873, 81,742 net tons, 162,000 tons in 1874, and in 1875, 166,978 tons.

#### McKEAN COUNTY, PENNSYLVANIA.

In the southern part of McKean County, in what is known as the fifth coal basin is an important coal district, located near the Buffalo and Rochester markets; the district is entitled to our attention and notice.

No other coal basin contains so large a body of coal, at its northern extremity as this, owing probably to its being situated on the dividing waters, where the work of denudation has been less destructive. The McKean and Buffalo railroad which extends from Larrabees, on the Buffalo, New York and Philadelphia Railroad, to Smethport, a distance of  $22\frac{1}{2}$  miles, gives an outlet for the coal from this district, the distance being but 108 miles to Buffalo, and 150 to Rochester.

Analyses and practical tests of considerable quantities of this coal, under stationary and locomotive boilers, indicate that it is a good quality of bituminous coal, with excellent steam-generating qualities. A company, known as "The Buffalo Coal Company," is developing this region. During 1875, while at work only six months, the business was 131,190 tons. We give the following analyses of three samples, from the Pennsylvania Geological survey report of 1875.

Water .....	1,130	1,300	1,170
Volatile matter.....	33,090	39,830	35,440
Fixed Carbon.....	53,006	52,063	43,992
Sulphur .....	1,874	1,727	1,708
Ash.....	10,900	5,080	17,690

#### MONONGAHELA REGION.

This district may truly be called the perfection of a coal region. The Monongahela river for 95 miles, possesses every advantage for facilitating the production of coal, and it is not surprising that the tonnage is so immense. The seam worked is of uniform thickness, and yields a pure coal, used for iron making, steam raising, and for gas and domestic purposes.

By means of its slack-water navigation, the Monongahela river is made navigable at all seasons of the year, and boats carrying eight hundred tons are passed down. The city of Pittsburgh is supplied mainly by railroad, and the larger portion of the coal going down by river, is run down the Ohio and Mississippi to the lower markets. The boats in use are known as "broad horns" carrying 20,000 bushels, "barges" carrying 11,000 bushels, and "flats" carrying 2,000 bushels. The following statement of shipments

by the slack-water navigation, from 1845 to date, is of interest :

Year.	Tons.	Year.	Tons.
1845.....	184,200	1860.....	1,517,909
1846.....	311,156	1861.....	834,630
1847.....	385,805	1862.....	743,358
1848.....	392,774	1863.....	1,134,150
1849.....	398,340	1864.....	1,402,828
1850.....	491,918	1865.....	1,580,791
1851.....	490,850	1866.....	1,704,212
1852.....	585,233	1867.....	1,202,908
1853.....	628,654	1868.....	1,812,040
1854.....	693,278	1869.....	2,100,504
1855.....	889,360	1870.....	2,303,856
1856.....	353,304	1871.....	1,944,852
1857.....	1,158,939	1872.....	2,291,220
1858.....	1,027,866	1873.....	2,094,312
1859.....	1,131,467	1874.....	2,503,504
	1875.....		2,275,265
	1876.....		2,495,800

The business done by the various railroads, entering or passing through this coal field, is indicated by the fact that in 1876 the Pennsylvania Railroad carried upwards of 1,300,000 tons from this district; the reader is referred to the details of the business done at the city of Pittsburgh, for figures of other railroads to which this region is tributary. In this connection, the cost of transporting coal over water ways, as—for instance—from Pittsburgh to New Orleans, is of value. The distance is something like 2000 miles, the rate is about  $3\frac{3}{4}$  cents per bushel, or \$1.05 per ton of 2240 lbs.; the ordinary time being about two weeks, when all circumstances are favorable. From Pittsburgh to Louisville, Ky., the distance is six hundred miles; the cost  $1\frac{3}{4}$  cents per bushel, including return of empty craft; and the time five days.

## WEST VIRGINIA GAS COAL.

That class of gas coal known in the New York and Eastern markets as "West Virginia Gas Coal," is mined in Marion, Taylor, Ritchie and Preston counties, West Virginia, the mines being located near to or upon the main line of the Baltimore and Ohio Railway. The coal is used for gas in the cities of the seaboard, and is very favorably spoken of. The distances to Baltimore are as follows: From Clarksburg, 301 miles; from Fairmount, 302 miles; from Newburg, 263 miles; from Tunnelton, 260 miles; from Cairo, 355 miles.

The veins are from six to eleven feet in thickness. Analyses of these coals have given the following results :

	Volatile matter.	Fixed carbon.	Ash.
Clarksburg, Main seam .....	56.74	41.66	1.60
“ Cannel.....	49.21	45.43	5.36

The trade to the seaboard<sup>d</sup> began in the year 1868 with 165,772 tons. The business to date has been as below:

Year.	Tons.	Year.	Tons.	Year.	Tons.	Year.	Tons.
1868.....	165,772	1870.....	249,879	1872.....	217,569	1874.....	125,000
1869.....	269,158	1871.....	189,763	1873.....	190,673	1875.....	100,000

In addition to the outlet eastward via B. & O. R. R. there is the Parkersburg route due west, crossing the Monongahela river at Clarksburg, and thence to the Ohio river at Parkersburg; and the Wheeling route north-westward, crossing the Monongahela at Fairmount, thence down the creek to the Ohio, and thence up the river to Wheeling. Both these branches enter the main coal measures near the crossing of the Monongahela above named, and traverse them to the Ohio. At Clarksburg and northward, down the Valley of the Monongahela, is one of the richest coal regions of West Virginia. One of the beds in the neighborhood of this town measures from ten to twelve feet in thickness, with a thinner bed of more highly bituminous nature underlying; from some distance above Clarksburg, they may be followed with scarcely an interruption throughout the whole valley of the Monongahela northward to Pittsburgh.

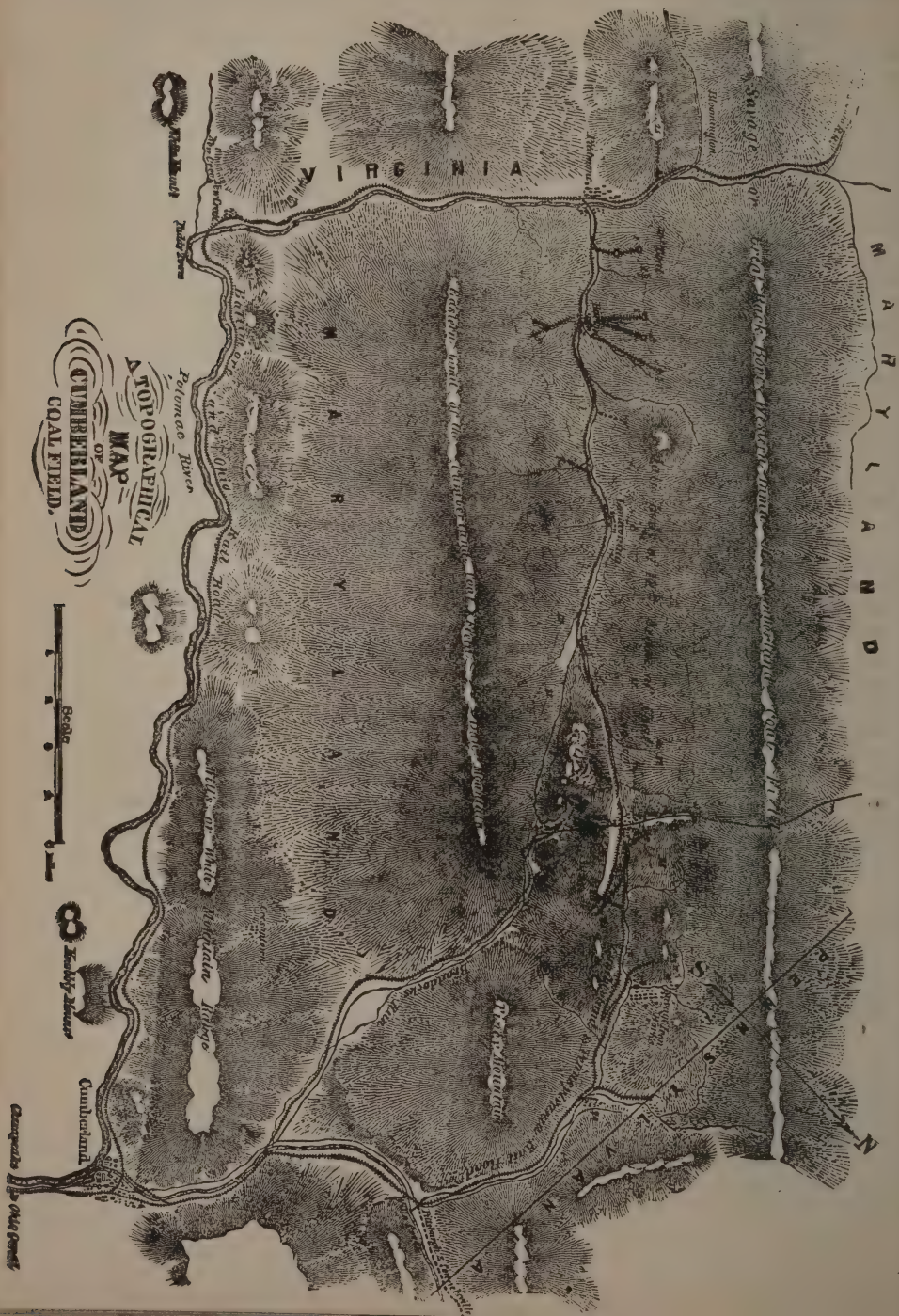
## THE CUMBERLAND, (MD.) REGION.

The Cumberland (George's Creek) coal field, located in Alleghany county, at the western extremity of the State of Maryland, supplies an important proportion of the Semi-Bituminous coal, reaching the seaboard markets. The connection with the tide-water markets are via the Baltimore & Ohio R. R., from the town of Cumberland, 178 miles, and Piedmont, 206 miles, west from Baltimore; via the Chesapeake and Ohio Canal, following the Potomac river to Georgetown, 184 miles, and Alexandria, 191 miles from Cumberland.

The production of the mines in this district is of superior quality; the coal worked is from seven to fourteen feet in thickness; the full extent of the vein is seldom taken out, the roof being insecure. The mines are located on the line of the Cumberland and Piedmont branch road, which extends through the region, and are distant from, say  $1\frac{1}{2}$  to 20 miles from Piedmont, and from 11 to 33 miles from Cumberland.

In the year 1842 this coal field sent its product to the tide-water markets over the branches of the B. & O. R. R., connecting with this field. In 1850 the Chesapeake and Ohio Canal was finished to Cumberland, Md.





In the fall of the year 1872, there was built a line from the Pennsylvania Railroad to tap the Cumberland road, the connection being made at or near Mt. Savage.

The following tables will show the business that has been done from this region.

*Forwarded by Baltimore & Ohio Railroad.*

Years.	Tons.	Years.	Tons.	Years.	Tons.
1842.....	1,708	1854.....	503,836	1866.....	736,153
1843.....	10,082	1855.....	478,486	1867.....	735,669
1844.....	14,890	1856.....	502,330	1868.....	848,118
1845.....	24,653	1857.....	465,912	1869.....	1,230,518
1846.....	29,795	1858.....	395,405	1870.....	1,112,938
1847.....	52,940	1859.....	426,512	1871.....	1,494,814
1848.....	79,571	1860.....	493,031	1872.....	1,517,347
1849.....	142,449	1861.....	172,075	1873.....	1,780,710
1850.....	192,806	1862.....	218,950	1874.....	1,576,160
1851.....	174,701	1863.....	531,553	1875.....	1,302,237
1852.....	268,459	1864.....	399,354	1876.....	1,070,775
1853.....	376,219	1865.....	560,293		

Grand total by this outlet.....19,921,446 tons—of 2240 lbs.

*Forwarded by Chesapeake and Ohio Canal.*

Years.	Tons.	Years.	Tons.	Years.	Tons.
1850.....	4,042	1859.....	297,842	1868.....	482,325
1851.....	82,978	1860.....	295,878	1869.....	652,151
1852.....	65,719	1861.....	97,599	1870.....	604,137
1853.....	157,760	1862.....	98,684	1871.....	850,339
1854.....	155,845	1863.....	216,792	1872.....	816,103
1855.....	183,786	1864.....	258,642	1873.....	778,802
1856.....	204,120	1865.....	343,202	1874.....	767,064
1857.....	116,574	1866.....	343,178	1875.....	879,838
1858.....	254,251	1867.....	458,153	1876.....	632,440

*Forwarded over Penn. State line branch.*

Year.	Tons.	Year.	Tons.
1872.....	22,021	1875.....	160,698
1873.....	114,589	1876.....	131,866
1874.....	67,671		

The average price for this coal f. o. b. at Baltimore, forms an interesting feature in connection with the trade therein :

Year.	Average Price at Baltimore.	Year.	Average Price at Baltimore.
1861.....	\$3 44	1866.....	\$5 94
1862.....	4 23	1867.....	4 97
1863.....	5 57	1868.....	4 71
1864.....	6 84	1869.....	4 97
1865.....	7 57	1870.....	4 72



Year.	Average Price at Baltimore.	Year.	Average Price at Baltimore.
1871.....	\$4 72	1871.....	\$4 63
1872.....	4 66	1875.....	4 42
1873.....	4 85	1876.....	3 75

The year last past was a very unfortunate one for the operators of this region; the opposition of the Railway carrying interest, controlling the outlet to market, tending to check the trade. The rates for coal at Baltimore and Georgetown were low, coastwise freights were favorable, and had the railway shown any disposition to foster the trade, a largely increased business might have been recorded, instead of a large deficit. This season may show an improvement in all this, as the cost of digging the coal has been reduced fifteen cents per ton. The rate of tolls over the line passing through the district, have been made to conform to the strict letter of the law, (a reduction from the rates of 1875, of one cent per ton, per mile). The C. & O. Canal and the B. & O. railroad each appear to have awakened to the necessity of fostering the trade, in every way, and we may look for better times in this connection. The scheme to construct a narrow gauge road from Lonaconing to Cumberland, will help the operators of this district as furnishing an additional outlet, and at the same time acting as a competitor.

The entire length of this coal field is from fifty to sixty miles: viz, from the head waters of George's Creek, near Frostburg, about fifteen miles to the north-east of Piedmont, to those of the north branch of the Potomac, some thirty miles to the south-east. The width of this valley averages six miles from outcrop to outcrop of the lower seams of coal. It is narrowest at the northern end, and widens out considerably at the southern. The total thickness of the coal containing strata is about 1400 feet, but this thickness does not pervade the entire area, as to the south of Piedmont and Bloomington the erosion has been greater, and it is only a few isolated hills that contain the upper seams of coal, notably the "big" or fourteen feet seam.

In the entire thickness there are many seams of coal, but there are only five or six of a thickness of three feet or over, as follows: commencing with the lowest, known as the "Parker" and "Bluebaugh" veins at the northern end of the region, and which lie near the bottom of the formation, and are crossed by the river and railroad at Piedmont.

About 150 feet above is the 6 feet seam.

About 300 feet above is the 3 feet seam. (Savage.)

About 380 feet above is the 5 feet 8 inch seam.

About 600 feet above is the 5 feet 9 inch seam.

About 850 feet above is the 14 feet or "Big Vein."



The coal from the smaller veins will hardly come into general use, while that from the other and larger, continues to be offered at so low a rate, as at present. Yet there have been many openings made in these smaller seams, they are of good quality and a considerable quantity has been disposed of last season.

The following statement shows the production of each company, operating in this region, during the years 1875 and 1876.

Company.	Tons in 1876.	Tons in 1875.
Consolidation .....	356,817	440,923
New Central.....	241,218	258,847
George's Creek C. & I. Co.....	198,796	166,357
Atlantic & George's Creek.....	149,930	122,916
Borden.....	145,818	232,458
American .....	127,942	180,125
Virginia Coal & Iron Co.....	101,615	31,181
Hampshire & Baltimore.....	94,589	153,685
Maryland.....	77,295	261,309
Swanton.....	67,196	68,559
Franklin .....	64,012	98,447
George's Creek Mining.....	61,885	85,881
Potomac .....	58,326	68,674
Blaen Avon.....	43,288	60,282
Piedmont .....	36,601	55,342
North Branch .....	7,108	26,490
New Reading.....	1,606	19,399
George's Creek Valley.....	1,039	.....
Davis mines .....	.....	5,866
Totals.....	1,835,081	2,342,773

## IMPORTS AND EXPORTS OF COAL.

By the courtesy of Dr. Edward Young, Chief of the Bureau of Statistics, at Washington, D. C., we are enabled to give the following in regard to the imports and exports of coal into and from the United States :

IMPORTS.		EXPORTS.	
Years.	Tons.	Years.	Tons.
1870.....	420,688	1870.....	227,918
1871.....	443,955	1871.....	277,951
1872.....	490,631	1872.....	401,078
1873.....	456,015	1873.....	584,633
1874.....	498,028	1874.....	763,402
1875.....	441,600	1875.....	519,345
1876.....	407,853	1876.....	568,076

Details of the exports for the fiscal year ending June 30, 1876, including all kinds of coal are as below: It may be regarded as certain that coal to Nova Scotia, Quebec, Ontario, etc., was mainly Anthracite, the other exportations representing Bituminous Coal. The total exports of Anthracite was 337,934 tons, Bituminous amounting to 230,144 tons.

	Tons.
To Brazil.....	2,144
To China.....	3,782
To Danish West Indies.....	4,784
To Nova Scotia.....	33,087
To Quebec, Ontario, &c. ....	445,352
To Mexico.....	2,590
To Cuba.....	44,965
To United States of Columbia.....	23,679
To other countries.....	7,695
Total.....	568,078

Imports and exports:	Calender year 1876.	Year 1875.
Imports Bituminous Coal.....	488,132	411,723
Exports Bituminous Coal.....	253,387	234,997
Exports Anthracite Coal.....	362,044	361,669

The imports of coal into the United States since 1821 have been :

Year.	Tons.	Year.	Tons.
1821.....	22,419	1830.....	58,582
1822.....	34,672	1831.....	36,508
1823.....	30,535	1832.....	72,978
1824.....	20,440	1833.....	92,432
1825.....	25,795	1834.....	71,626
1826.....	34,643	1835.....	59,968
1827.....	40,264	1836.....	108,432
1828.....	32,364	1837.....	153,450
1829.....	45,463	1838.....	129,082

Year.	Tons.	Year.	Tons.
1839.....	181,555	1855.....	287,408
1840.....	162,867	1856.....	293,507
1841.....	155,394	1857.....	360,712
1842.....	141,521	1858.....	396,628
1843.....	41,163	1859.....	403,928
1844.....	87,073	1860.....	398,986
1845.....	85,766	1861.....	465,434
1846.....	156,853	1862.....	541,099
1847.....	148,021	1863.....	624,378
1848.....	196,168	1864.....	567,738
1849.....	198,213	1865.....	684,180
1850.....	180,439	1866.....	696,093
1851.....	214,774	1867.....	521,305
1852.....	183,015	1868.....	396,128
1853.....	231,508	1869.....	423,566
1854.....	252,865	1870.....	420,683

The tariff from 1824 to 1843, was six cents per bushel, or \$1.68 per ton; from 1843 to 1846, \$1.75 per ton. 1846, 30 per cent advalorem; 1847 to 1861, 24 per cent advalorem, 1862-3-4, \$1.00 per ton; 1865, \$1.10; 1866 to 1872, \$1.25 per ton; 1872, (August) 75 cents per ton. During the period from June 1854 to March 1866 the Reciprocity treaty was in force, and coal from the British possessions in North America, was admitted into the United States duty free.

## NOVA SCOTIA.

The coal from the mines in this Province has always found a market in the United States, to a greater or less extent; of late there has not been so much received here, for the reason that the domestic mines of Bituminous coal have been more extensively worked, freights have been at low rate on land and water; this, together with the depression in general business pursuits since the financial panic of September 1873, has had its influence upon the product and sales, as may be seen from the schedules given. The Government Inspector of Mines, H. S. Poole, furnishes the following summary of the coal sales in Nova Scotia.

Years.	Tons.	Years.	Tons.
1785 to 1790.....	14,349	1831 to 1840.....	839,981
1791 to 1800.....	51,048	1841 to 1850.....	1,533,798
1801 to 1810.....	70,452	1851 to 1860.....	2,399,829
1811 to 1820.....	91,527	1861 to 1870.....	4,927,339
1821 to 1830.....	140,820	A total of.....	10,069,143
For 1871.....	596,418	For 1872.....	785,914
For 1873.....	881,106	For 1874.....	749,127
For 1875.....	706,795	For 1876.....	634,207



The duty on coal imported into the United States from any foreign country is seventy-five cents per ton, gold, or the round or coarse coal, and forty cents per ton, on the culm or slack; that is the coal which passes through bars not wider than three quarters of an inch. About eight per cent of the coal sold is culm, we give below the duty at various dates.

1846 to 1862.....	24 per cent advalorem.
1862-3-4.....	1.00 per ton.
1865.....	1.10 per ton.
1866-1872.....	1.25 per ton.
1872 to date.....	75 cts., per ton.

Reciprocity Treaty in force from June 1854 to March 1866.

Number of tons *actually raised* during a term of years.

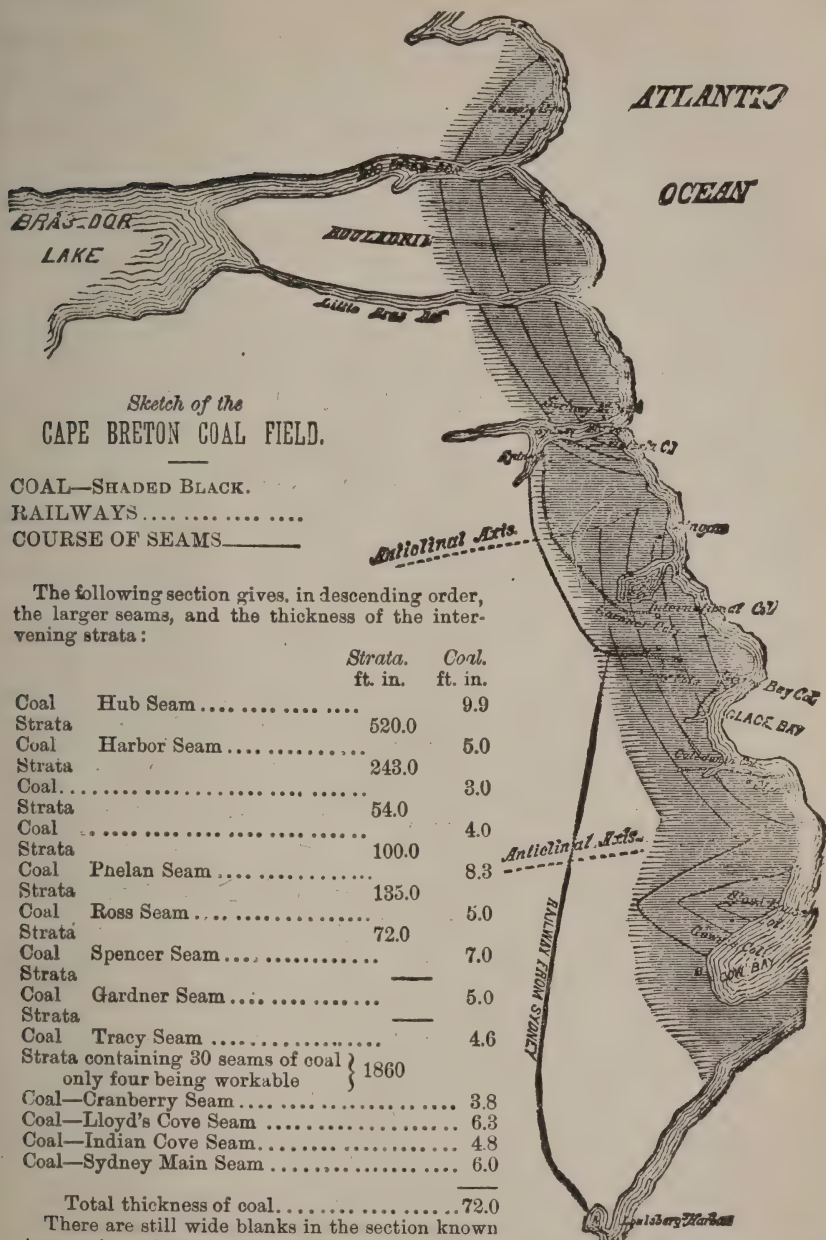
Year.	Tons.	Years.	Tons.
1864.....	562,102	1870.....	625,769
1865.....	715,786	1871.....	673,242
1866.....	664,998	1872.....	880,950
1867.....	517,525	1873.....	1,051,467
1868.....	462,188	1874.....	872,720
1869.....	578,062	1875.....	781,165
1876.....	709,646		

Comparing the *sales* of 1876 with previous years, we obtain the following table:

County.	1876.	1875.	1874.	1873.	1872.
Cumberland.....	84,523	60,944	49,599	26,345	14,153
Pictou.....	275,618	337,102	357,926	333,974	388,417
Cape Breton.....	268,808	304,702	337,016	520,189	380,373
Other counties.....	5,253	4,047	4,586	588	3,070
Total tons.....	634,207	706,795	749,127	881,106	785,814

The destination of the coal sold during the year 1876, together with a comparison of the "*markets*" for each year is shown below:—

Markets.	1876—Tons.	1875—Tons.	1874—Tons.	1873—Tons.
Nova Scotia.....	225,658	212,630	214,965	215,295
Quebec.....	117,303	189,754	162,169	187,059
New Brunswick.....	101,890	85,968	78,841	68,217
Newfoundland.....	51,742	62,348	55,696	55,867
P. E. Island.....	46,908	43,641	41,948	26,840
United States.....	71,634	88,746	138,395	264,700
West Indies.....	17,971	16,429	47,844	54,213
South America.....		4,779	5,077	1,885
East Indies.....		1,003		
Great Britain.....	1,101	497	4,152	6,976
Total.....	634,207	706,795	749,127	881,106



Production of each colliery for the years 1874, 1875 and 1876.

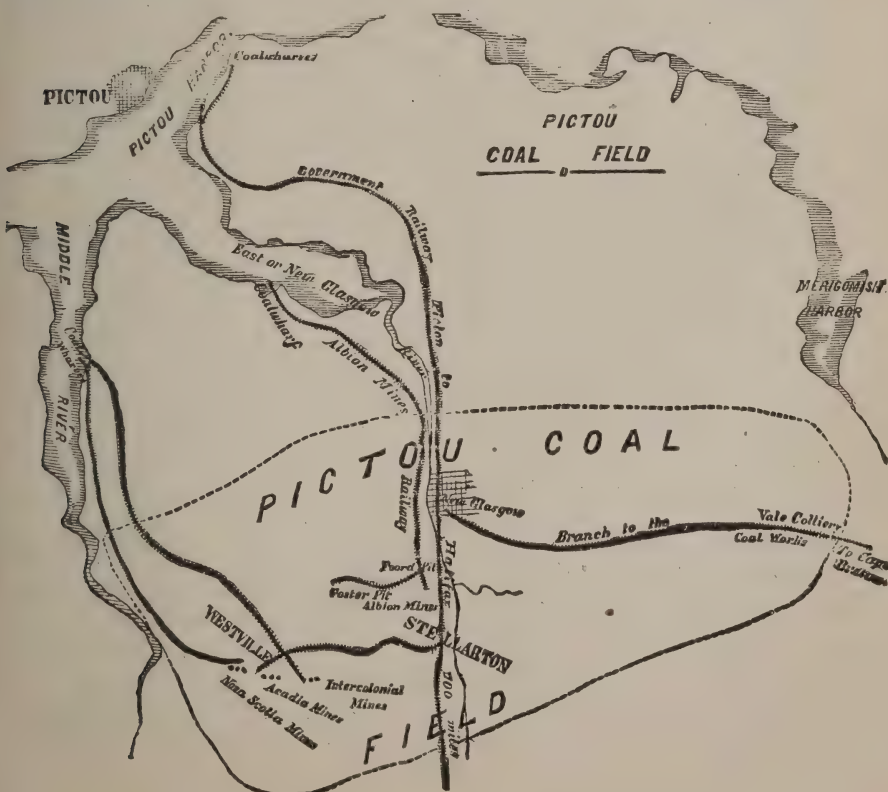
DISTRICT.	1876.	1875.	1874.
CUMBERLAND COUNTY.	Product.	Product.	Product.
Cumberland.....	5,055	336	—
Lawrence.....	—	60	27
Searnan.....	—	528	—
Scotia.....	1,286	1,460	1,741
Joggins.....	14,296	11,908	16,685
Spring Hill.....	72,595	50,505	33,137
PICTOU COUNTY.			
Acadia.....	60,280	65,992	110,734
Albion Deep.....	136,273	46,948	41,188
Albion Main.....	—	90,121	94,343
Intercolonial.....	53,872	72,016	68,069
Whitehall.....	—	214	90
Nova Scotia.....	21,375	60,824	56,953
Vale.....	34,590	46,547	39,099
CAPE BRETON COUNTY.			
Blockhouse.....	34,819	23,064	28,897
Caledonia.....	30,789	16,566	39,388
Collins.....	7,693	662	—
Emery.....	.....	8,356	22,137
Gardiner.....	.....	10,400	20,196
Glace Bay.....	30,022	22,734	46,535
Gowrie.....	20,275	23,924	32,857
Ingraham.....	40	150	67
International.....	24,111	40,489	36,385
Lingan.....	15,289	22,805	19,697
Ontario.....	11,095	5,653	7,070
Reserve.....	.....	9,493	28,769
Schooner Pond.....	.....	.....	1,523
South Head.....	653	1,116	.....
Sydney.....	102,644	124,199	105,487
Victoria.....	17,672	18,814	15,310
INVERNESS COUNTY.			
Port Hood.....	2,548	720	35
VICTORIA COUNTY,			
New Campbellton.....	3,362	4,561	5,961
Total tons of coal raised.....	709,646	781,165	872,720

The ton weight designated is that of 2,240 pounds, in all cases. The coals raised are used for gas, steam and domestic purposes generally, and find favor where they have been used. It will have been noticed that the most important districts are Pictou and Cape Breton; the former coal field is said to contain some twenty-eight square miles, while the latter extends along the coast for thirty-five miles, there are many seams of workable coal



that have not yet been developed, and further discoveries are constantly being noticed. We append an analysis of certain of the coals, tested for gas purposes. Albertite, a variety of Asphalt yielding 14,500 cubic feet of 54 candle illuminating power gas to the ton, is found in New Brunswick. Coke is being made from the slack, for use among the iron industries, and this must prove a source of wealth to the Provincial coal owners.

<i>Seam.</i>	<i>Cubic feet per ton.</i>	<i>Candle power.</i>	<i>Chemist.</i>
Victoria.....	9,340	.....	.....
Albion.....	7,180	15	Johnson.
Mc Gregor.....	9,500	13	Manhattan Co.
Blockhouse.....	10,217	17	Manhattan Co.
Phelan.....	9,500	16.5	.....
Emery.....	9,500	.....	Percy.
Hub.....	9,560	13	.....
Hub.....	10,080	16	Harrington.
Harbor.....	9,846	16.7	.....
Harbor.....	10,106	17	Harrington.
Lingan.....	9,900	17	Imperial Gas.
Lingan.....	9,520	13	Chandler.
Sydney (Main).....	9,500	.....	How.
Mc Auley.....	9,000	15	Richard.



## VANCOUVERS ISLAND.

This island is located on the western coast of North America, and is within the limits of the Dominion of Canada. The coal area is estimated at 390 square miles. A considerable portion of the coal supplied to San Francisco, Cal., is brought from this island. The tonnage produced is stated as below :

Year.	Tons.	Year.	Tons.
1870.....	29,863	1874.....	81,397
1871.....	45,000	1875.....	113,000
1872.....	46,148	1876.....	140,087
1873.....	45,723		

## COAL IN SPAIN.

There are said to be something like 3,501 square miles of coal producing area in this country; in the provinces of Castile, Leon, and the Asturias. The figures of the production for a term of years, are as below—expressed in tons of ten metric quintals=2200 lbs.

Year.	Tons.	Year.	Tons.
1870.....	414,482	1873.....	589,707
1871.....	500,000	1874.....	600,000
1872.....	570,000	1875.....	560,000

## COAL IN ITALY.

The product of coal in Italy, in 1874, was 2,000 tons of Anthracite (?) 90,500 tons of Brown coal, and 90,000 tons of Peat coal.

## FRANCE.

Probably one million tons of what is known as Anthracite, and the same quantity of soft Anthracite, are annually produced in France, the balance being Bituminous coal.

The production of coal in France, since 1787, has been as follows (tons of 2200 pounds, or ten metric quintals) :

Year.	Tons.	Year.	Tons.
1787.....	211,160	1821.....	1,114,448
1802.....	829,105	1826.....	1,513,482
1811.....	759,878	1831.....	1,728,950
1816.....	924,823	1836.....	2,789,858

Year.	Tons.	Year.	Tons.
1841.....	3,349,303	1869.....	13,108,662
1846.....	4,389,532	1870.....	6,550,000
1852.....	4,816,306	1871.....	13,400,000
1857.....	7,755,987	1872.....	15,899,005
1862.....	10,102,116	1873.....	17,500,000
1867.....	12,148,223	1874.....	17,059,547
1868.....	13,253,876	1875.....	16,949,031

M. Burat divides the coal-measures of France into five distinct geographical groups.—The coal-measures of the North of France form a long and narrow zone which crosses Belgium, and lies at the surface from Aix-la-Chapelle to beyond Mons. It can be followed for 250 miles in the line of Liege, Charleroi, Valenciennes, Douai, Bethune, with offsets into the Boulogne district, Rety, Ferques, Fiennes, and Hardinghem, where it begins to make its descent below the Channel, to reappear in England. The surface of this great basin is about 625,000 acres in extent, the breadth of the carboniferous zone varies from 20 feet to 33,000 feet. France, however, owns but the small share of this measure which lies in the departments of the Nord and the Pas-de-Calais.—In the coal-measures of the east of France are comprised the basin of the Saar and that of Ronchamps (Haute-Saone). The Saar basin, which is above ground in Prussia, is continued below ground under the secondary formations of the Moselle, just as the great Belgian basin is continued along the right bank of the Rhine to form the rich basin of the Ruhr. With this group we may connect the Alpine offsets of Savoy and the Valais.—The western coal-measures, comprising the basins of the Basse-Loire, and of La Vendee, yield anthracite and anthracite fuel.—The coal-measures of the centre comprise the rich fields of Saone-et-Loire, the Alier, the Loire, and Auvergne. The basin of the Loire alone has a superficial area of about 64,000 acres, that of Saone-et Loire, 108,000 acres.—The coal-measures of the south, situated in the valleys of the Lot, the Herault, and the Gard, comprise several basins, the two most important of which are the colliery groups of the Aveyron and the Gard, comprising between them an area of 67,220 acres. At the extremity of the chain of the Alps, there is a small open coal-field, cropping up at different points of the Var.

These various measures are isolated one from the other by mountain masses, valleys, and strata belonging to different geological periods. The irregular conditions under which French coal is found adds considerably to the cost of winning.

France imports from England and Belgium, some six millions of tons of coal annually; the amount from the former country being 2,558,678 tons in 1875, and 3,250,559 tons in 1876.



## GREAT BRITAIN.

## MINERALS PRODUCED IN GREAT BRITAIN.

MINERALS.	Tons raised in 1873.	Tons raised in 1874.	Tons raised in 1875.
Coal.....	127,016,747	125,043,257	131,867,105
Iron ore.....	15,577,499	14,844,936	15,821,060
Copper ore.....	80,188	78,521	71,528
Tin ore.....	14,885	14,039	13,995
Lead ore.....	73,500	76,201	77,746
Zinc ore.....	15,969	16,830	23,978
Iron pyrites.....	58,924	56,208	48,035
Arsenic.....	5,448	6,268	5,061
Manganese.....	8,671	5,778	3,205
Ochre, Umber, etc.....	6,368	7,122	5,315
Wolfram.....	50	32	46
Fluor spar.....	.....	634	358
Barytes.....	10,269	14,374	15,549
Clays—fine and fire, and shale.....	1,785,000	2,436,912	3,450,780
Coprolites.....	.....	149,654	250,122
Salt.....	1,785,000	2,306,567	2,316,644

## METALS OBTAINED FROM THE ORES ENUMERATED.

	1873—tons.	1874—tons.	1875—tons.
Iron, pig.....	6,556,451	6,991,408	6,365,462
Tin.....	9,972	9,942	9,614
Copper.....	5,240	4,981	4,322
Lead.....	54,235	58,777	57,435
Zinc.....	4,471	4,476	6,715
Silver.....(ozs.)	537,707	509,277	487,358

Absolute total value of the metals and coal, with other minerals which are not smelted (except building stone, lime, slate, and common clay,) produced in the United Kingdom:

	1873.	1874.	1875.
Value of the metals produced.....	£21,409,878	£19,539,070	£18,476,746
Value of the coal.....	47,629,787	45,849,194	46,163,486
Value of other minerals.....	1,681,834	2,446,049	2,847,456
Total.....	£70,721,499	£67,834,313	£67,487,688

The ton weight in all cases, is 2240 pounds.

The amount of coal exported from Great Britain, during the year 1876, was as follows :

Countries.	Tons.	Countries.	Tons.
Russia.....	1,182,384	Turkey.....	294,214
Sweden and Norway.....	1,156,855	Egypt.....	543,668
Denmark.....	777,297	Brazil.....	327,084
Germany.....	2,271,901	Malta.....	298,858
Holland.....	478,993	British India.....	750,182
France.....	3,250,599	Other Countries.....	2,945,538
Spain and Canaries.....	762,031	Coal, etc., for steamers en-	
Italy.....	1,226,205	gaged in foreign trade....	3,564,524

Grand Total..... 19,930,363

The production of coal in each district, during the year 1875, was as below :

County.	No. of Collieries.	Tons Produced.
North Durham and Northumberland .....	170	12,640,789
South Durham .....	177	19,456,534
Cumberland and Westmoreland .....	39	1,226,737
Cheshire .....	37	658,945
Lancashire, North and East .....	400	8,825,798
Lancashire, West .....	188	8,250,246
Yorkshire .....	523	15,425,278
Derbyshire .....	255	7,091,325
Nottinghamshire .....	46	3,250,300
Warwickshire .....	31	779,750
Leicestershire .....	25	1,154,619
South Staffordshire and Worcestershire .....	442	10,251,791
Staffordshire, North .....	157	4,456,213
Shropshire .....	64	1,229,785
Gloucestershire .....	90	1,273,080
Somersetshire .....	40	654,878
Monmouthshire .....	91	3,525,975
North Wales .....	124	2,337,308
South Wales .....	415	10,632,597
Scotland, East .....	334	11,419,619
Scotland, West .....	232	7,177,888
Ireland .....	53	127,950

Making the grand total of the United Kingdom..... 3,933 131,867,105

The following will show the exportation of coal since 1854 :

Year.	Tons.	Year.	Tons.
1854.....	4,300,000	1866.....	9,053,721
1855.....	4,900,000	1867.....	10,415,787
1856.....	5,800,000	1868.....	10,837,804
1857.....	6,600,000	1869.....	10,588,425
1858.....	6,500,000	1870.....	11,495,002
1859.....	7,000,000	1871.....	12,851,957
1860.....	7,400,000	1872.....	13,211,961
1861.....	7,200,000	1873.....	12,712,222
1862.....	7,600,000	1874.....	13,927,205
1863.....	7,500,000	1875.....	14,475,036
1864.....	8,809,908	1876.....	19,930,363
1865.....	9,170,477		

The receipts of coal at London for a series of years have been as below :

Year.	By Sea.	By Canal.	By Rail.	Total.
1865.....	3,161,683	8,532	2,733,056	5,903,271
1866.....	3,033,193	10,176	2,969,896	6,013,215
1867.....	3,016,416	9,965	3,295,652	6,322,033
1868.....	2,918,230	9,527	2,979,333	5,907,090
1869.....	2,873,688	6,941	3,341,585	6,212,214
1870.....	2,993,710	7,301	3,758,089	6,759,100
1871.....	2,762,712	6,615	4,449,141	7,218,468
1872.....	3,548,918	8,236	4,999,268	7,556,422
1873.....	2,665,630	11,195	5,147,413	7,824,238
1874.....	2,727,719	5,932	4,689,785	7,423,486
1875.....	3,134,846	4,594	5,065,452	8,204,892

## AUSTRIA.

This country contains something like eighteen-hundred square miles of coal producing area, and may be regarded as one of the richest coal-producing nations of Europe. It is only recently that this has been turned to profitable account. In 1818 the production of coal in Austria and Hungary was 84,450 tons; in 1828 it was 153,950 tons; in 1838, 299,100 tons; in 1848, 838,000 tons, and in 1858, this had increased to 2,598,800 tons. About one-half of the coal produced is Lignite or Brown coal. We give statistics of the production, for a number of years:

Year.	Tons.	Year.	Tons.
1860.....	3,128,478	1868.....	6,199,027
1861.....	3,629,662	1869.....	6,685,161
1862.....	4,064,718	1870.....	6,443,575
1863.....	4,083,820	1871.....	9,891,350
1864.....	4,101,698	1872.....	10,389,952
1865.....	3,732,416	1873.....	10,500,000
1866.....	4,369,582	1874.....	11,000,000
1867.....	5,445,391	1875.....	10,895,000

## RUSSIA.

The total area of coal fields of this Empire, is estimated to be thirty thousand square miles; the chief sources of supply, are, the basin of the lower Don, which amounts to nearly one-half of this area, the coal being what is said to be Anthracite; in the West, the government of Kiev and Kharkoff; further to the north, the great central basins, comprising the governments of Tver, Kalouga, Moscow, Ruzin, Tula and Novgorod, extending northward as far as the Dwina. To these items may be added that of the Kharkoff beds of Anthracite, and private coal beds of the districts lying to the east of the Vistula.

We are enabled to give the following statistics of the production. It will be noticed that the coal industry is rapidly developing in this country:

Year.	Tons.	Year.	Tons.
1870.....	817,008	1873.....	1,123,940
1871.....	829,722	1874.....	1,343,558
1872.....	1,097,832	1875.....	1,750,000

## COAL IN INDIA.

The coal area of the Indian Empire, is stated at 2,004 square miles; the production is rapidly increasing until now an annual output of one million tons is recorded. We have this official statement, that in 1875, some 850,000 tons were mined, as against 500,000 tons in the year 1870.



## . BELGIUM.

The coal area of the kingdom is stated at 510 square miles; as will be seen from the figures given below, the production is quite large, having averaged something like fifteen million tons annually, for some years past. The province of Hainaut furnishes the largest proportion, 10,698,130 tons having been mined there during the year 1875; there is an export trade of about four million of tons to France and Germany, and an import of half a million tons, from Great Britain.

Progress of the coal output in Belgium.

Years.	Tons.	Years.	Tons.
1836.....	2,056,464	1870.....	13,691,118
1846.....	5,037,403	1871.....	13,733,176
1856.....	8,212,419	1872.....	15,158,948
1866.....	12,774,662	1873.....	15,778,401
1867.....	12,755,822	1874.....	14,669,029
1868.....	12,298,589	1875.....	15,011,311
1869.....	12,926,894	1876.....	.....

The Belgian ton is 1000 kilogrammes=2,200 pounds English.

## NEW SOUTH WALES.

One of the most important coal producing countries of the globe is that portion of Australia, known as New South Wales; the trade has sprung up within a very few years, and the outlook for the trade is most encouraging, as the coal has been found equal to the English steam coal, and adopted by the home government; the approximate area of the coal fields is 24,840 square miles; the production from the opening of the mines up to the year 1874, has amounted to 12,387,279 tons, valued at £6,655,328, there was raised in the year 1874, 1,304,567 tons, of which 872,980 tons was sent out of the country; the cost of raising the coal is less than one dollar per ton, while the selling price, f. o. b. vessel, is three dollars and a half per ton. The coals produced are of various qualities, as will appear from the following statements.

In the Newcastle district is found Bituminous coal, used for steam, household, smelting, gas, blacksmith, and coking purposes. At Four-mile Creek and Branxton, &c., in the Northern district, there are Splint and Bituminous coals, suitable for steam, household, gas, smelting, blacksmith, and coking purposes.

In the Western district at Lithgow Valley, Hartley, and Mudgee Road, is found the Splint coal used for household, steam, smelting, gas blacksmith, and coking purposes.

In the Southern or Illawarra district, Semi-Bituminous coal, used for steam, household, smelting, and blacksmith purposes is found.

At present the Newcastle district sends out upwards of ninety per cent. of the whole production; in the Western district is found the Bituminous shale, which is distilled for illuminating oil, and also used in its raw state, as an enricher for gas, as it yields 14,198 cubic feet of gas, of 74.08 candle power; the seam is only a few inches in thickness, and is worked by an adit on the outcrop.

W. B. Clarke, M. A., in his report on the sedimentary deposits of New South Wales, embodied in the government reports, speaks of the geological position of the shales thus :

"Recent researches have satisfied me that these only belong to the upper coal measures. It has unquestionably resulted from the local deposition of some resinous wood, and passes generally into ordinary coal. There is no anomaly in finding in one spot a mere patch in a coal seam as at Anvil Creek, on the Hunter River; or thick bedded masses, as in the coal seams of Mount York, the thickness depending on the original amount of drift timber."

W. Keene, F. G. S., government examiner of coal fields, says :

"The lower beds of the coal series of New South Wales are geologically older than any worked in Europe, while the upper beds represent the most recent of the European true carboniferous formation. I have examined seams more than seven hundred miles to the north of Newcastle, belonging to the same deposits we are working here (Newcastle) and we may, without boasting, claim to rank with the most extensive coal fields in the world."

It is stated that although the kerosene shale has only been worked at Hartley and Wollongong, it may possibly be found in connection with any of the different coal seams, and as these spread over an enormous area of country, it is impossible to place any limits on the quantity of this peculiar mineral that the colony may possess.

We are enabled to give the following statistics of the coal production :—

Year.	Tons.	Year.	Tons.
1864.....	549,012	1870.....	868,564
1865.....	585,525	1871.....	898,784
1866.....	774,238	1872.....	1,012,426
1867.....	770,012	1873.....	1,092,862
1868.....	954,230	1874.....	1,298,400
1869.....	919,773	1875.....	..

## CHICAGO, ILL.

This city is in direct rail and water communication with the Anthracite coal mines, and is therefore freely supplied at low rates, and the startling result is shown, that although the railway system connecting this city with many of the Western Bituminous coal fields is so thoroughly complete, the amount of Anthracite now received, exceeds the quantity of Bituminous of all other kinds. The Anthracite coal Association of Pennsylvania, own their own roads from the mines to Buffalo and Oswego, and can lay down coal at either port at a moderate rate. Anthracite coal is largely exported from this city to St. Louis, Missouri, Kansas and Nebraska, also to Wisconsin, Iowa and Minnesota. The rates of freight from Buffalo to Chicago during the year 1876, were from twenty-five cents to one dollar and twenty five cents per net ton.

Chicago is now one of the most important markets in the country for soft coal, for local manufacturing and other purposes, and is the distributing point for a large section of the Northwest.

The receipts for the years 1874, 1875 and 1876, are shown below :

Received By.	Tons—1874.	Tons—1875.	Tons—1876.
Lake.....	661,583	748,706	711,572
Illinois and Michigan Canal.....	11,646	7,778	5,292
Chicago and Northwestern Railroad.....	2,092	5,564	.....
Illinois Central Railroad.....	35,921	38,288	16,348
Chicago, Rock Island and Pacific Railroad.	18,135	31,893	22,703
Chicago, Burlington and Quincy Railroad...	27,661	5,821	10,986
Chicago and Alton Railroad.....	254,030	278,006	293,807
Chicago, Danville and Vincennes Railroad...	147,701	205,530	196,865
Lake Shore and Michigan Southern.....	455	778	55,205
Pittsburgh, Ft. Wayne and Chicago Railroad	64,314	112,609	142,691
Pittsburgh, Cincinnati and St. Louis Railroad	133,232	150,349	106,774
Baltimore and Ohio Railroad.....	2,726	57,900	17,804
Michigan Central Railroad.....	.....	3,266	38,774
Total.....	1,359,496	1,641,488	1,619,033

The ton weight designated in these tables is that of 2,000 pounds.

The shipments from the city are by railway, mainly by the Chicago and Northwestern Railroad, to points in the Western States, and foot up 249,-862 tons for the year 1876.

The following tables evidence the growth of the coal trade at this city :

## RECEIPTS BY LAKE.

Years.	ANTHRACITE.	Tons.	Years.	BITUMINOUS.	Tons.
1870.....		340,730	1870.....		181,850
1872.....		495,765	1872.....		90,820
1873.....		538,837	1873.....		199,107
1874.....		404,333	1874.....		257,200
1875.....		474,812	1875.....		365,817
1876.....		373,146	1876.....		338,426



## TOTAL RECEIPTS AT THE CITY OF CHICAGO.

Year.	Tons.	Year.	Tons.
1852.....	46,233	1864.....	323,275
1853.....	38,548	1865.....	344,854
1854.....	56,774	1866.....	496,193
1855.....	109,576	1867.....	546,208
1856.....	93,020	1868.....	658,243
1857.....	171,379	1869.....	799,000
1858.....	87,290	1870.....	887,474
1859.....	131,204	1871.....	1,081,472
1860.....	131,080	1872.....	1,398,024
1861.....	184,089	1873.....	1,668,257
1862.....	218,423	1874.....	1,359,496
1863.....	284,196	1875.....	1,641,488
1876.....	1,619,023		

## BUFFALO, N. Y.

The distribution of the coal received here is divided into city trade for family use, rolling mills, furnaces, manufactories and gas works; interior trade for gas works, family use and manufacturing purposes; and all points of the West are supplied, principally with Anthracite, which is taken by vessels from this port to Chicago, Milwaukee, Duluth, etc.

The receipts for a series of years have been as below:

Year.	BITUMINOUS.			—ANTHRACITE.—	
	By Lake.	By Canal.	By L. S. & M. S. R. R.	By Canal.	By Rail.
1863.....	71,323	12,551	.....	123,319	.....
1864.....	65,214	35,237	.....	154,214	.....
1865.....	68,141	42,322	.....	143,998	.....
1866.....	68,142	62,172	.....	248,716	.....
1867.....	101,107	67,124	.....	223,718	.....
1868.....	91,457	73,596	.....	318,353	.....
1869.....	99,460	108,972	.....	112,914	187,000
1870.....	94,796	163,437	.....	177,027	250,000
1871.....	88,511	80,660	76,063	102,185	300,000
1872.....	78,879	95,500	109,397	190,994	330,000
1873.....	87,724	125,000	190,000	255,044	479,885
1874.....	67,467	70,000	140,000	252,262	320,000
1875.....	32,767	45,000	350,000	250,206	500,000
1876.....	21,418	30,000	297,842	151,175	350,000

The shipments of Bituminous eastward by canal from Buffalo were as below:

Year.	Tons.	Year.	Tons.
1863.....	20,125	1870.....	65,900
1864.....	30,043	1871.....	60,522
1865.....	28,283	1872.....	53,198
1866.....	50,202	1873.....	68,210
1867.....	57,495	1874.....	46,995
1868.....	59,766	1875.....	23,100
1869.....	62,690	1876.....	19,153

There was 80,000 tons of Blossburg Semi-Bituminous received in 1873, 0,000 tons in 1874, 75,000 tons in 1875, and 25,000 in 1876 by railroad. The amount of Anthracite that was shipped westward, via the lakes, was 10,443 tons in 1873, 344,500 in 1874, 339,722 tons in 1875, and 321,455 in 1876. There was 60,000 tons of Blossburg Semi-Bituminous shipped west, via the lakes in 1873, 40,000 in 1874, 50,000 tons in 1875, and 40,000 in 1876.

Freights ranged from 25 cents to \$1 25 per ton to Chicago, Ills.

The ton weight in use here is that of 2,000 lbs.

## ST. LOUIS, MO.

By far the largest proportion of the Bituminous coal received at this city is from the Belleville district, in St. Clair county, Illinois; the principal seam worked is five to seven feet in thickness, and is economically mined. Analysis of this coal shows, Water 6; Volatile matter 38.8; Fixed Carbon 55.2; Ash 5. The Iron Mountain Railroad brings the Semi-Anthracite coal known as the "Spadra" from Arkansas, to this city.

The following statement shows the receipts of coal at St. Louis for the five years last past.

ROUTE.	1876. Bushels.	1875. Bushels.	1874. Bushels.	1873. Bushels.	1872. Bushels.
Ohio and Mississippi Railroad.....	3,511,825	3,966,100	4,034,750	5,118,375	4,600,000
St. L. A. and Chicago " .....	12,500	44,500	108,000	75,000	273,750
Ind. and St. Louis " .....	316,750	456,200	620,000	388,350	341,825
Missouri Pacific " .....	.....	none	5,125	8,475	78,200
St. Louis and Iron M'n " .....	88,600	43,800	10,400	4,250	45,100
St. L., Vandalia & T. H. " .....	5,818,450	4,734,650	2,907,800	3,597,200	203,225
Belleville and Southern " ...	8,305,125	8,816,000	7,811,075	9,995,925	8,521,900
Toledo. Wab. & Western " .....	612,950	144,250	363,000	461,025	151,000
St. Louis & Southeastern " .....	4,347,900	4,302,000	3,982,500	3,155,975	2,279,625
Illinois and St. Louis " .....	5,242,375	5,121,675	4,831,525	4,535,734	3,045,300
Mo., Kansas & Texas " .....	.....	250	.....	.....	750
Cairo & St. Louis " .....	2,167,850	2,009,225	1,405,500	182,975	.....
From Ohio River.....	671,250	1,328,000	1,410,375	1,500,000	1,305,500
From Grand Tower.....	102,550	500,000	700,000	1,050,000	1,204,125
From Illinois River .....	.....	none	33,000	35,511	7,125
From St. Louis Co.—Estimated..	875,000	1,000,000	1,600,000	2,500,000	2,500,000
Total.....	32,073,125	32,466,650	29,823,050	32,608,795	24,557,425

25 bushels of 80 lbs. each, to the net ton of 2,000 lbs.

## PROVIDENCE, R. I.

The total amount of coal reported as received at this port during the year 1876 was 610,339 tons. For 1875, 602,847 tons domestic and 663 tons foreign; for 1874, 539,169 tons, 532,564 tons domestic and 6,604 tons foreign; for 1873, 634,112 tons domestic, 3,232 foreign; for 1872, 623,842 tons domestic, 9,454 tons foreign; for year 1871, 504,006 tons domestic, 13,900 tons foreign.

## BOSTON, MASS.

The receipts are shown below :

From	Tons, 1874.	Tons, 1875.	Tons, 1876.
Alexandria, Virginia.....	86,705	97,697	49,643
Georgetown, District of Columbia .....	27,753	20,567	12,945
Philadelphia, Pennsylvania.....	578,432	623,245	639,643
Baltimore, Maryland .....	197,513	168,798	151,118
Other places (New York, etc.).....	235,113	290,271	294,221
Great Britain.....	2,780	2,738	6,177
Nova Scotia .....	48,658	29,706	26,451
Total.....	1,175,954	1,233,022	1,180,204

The receipts of foreign and domestic coal at this port have been as follows :

Years.	Foreign. Tons.	Domestic. Tons.	Years.	Foreign. Tons.	Domestic. Tons.
1876.....	32,628	1,147,576	1869.....	110,466	764,017
1875.....	32,444	1,200,578	1868.....	103,901	742,481
1874.....	51,438	1,125,516	1867.....	117,440	680,221
1873.....	87,700	1,076,673	1866.....	159,380	676,376
1872.....	90,739	1,068,781	1865.....	209,225	538,917
1871.....	109,013	822,808	1864.....	188,786	516,665
1870.....	115,022	819,890	1863.....	180,445	589,921

These figures include all the coal going to this port, both for the home trade, and for the points reached by the railroads centering here.

The following are the highest and lowest prices for Anthracite and Provincial coal, for the years named, as per statistics of the *Commercial List*.

	Anthracite, per ton.	Nova Scotia. per ton.
1876 .....	\$6.00@ \$8.25	\$4.75@ \$6.00
1875 .....	7.00 - 9.00	5.25 6.25
1874 .....	7.00 9.00	5.75 7.75
1873 .....	8.00 10.00	7.00 9.00
1872 .....	7.00 10.00	6.00 8.50
1871 .....	7.00 10.00	5.75 7.00



## CINCINNATI, OHIO.

The coal received at this city includes Youghiogheny from the neighborhood of Pittsburgh, Pa.; the Pomeroy from the vicinity of Pomeroy, Ohio; Hocking Valley, Ohio; Muskingum, Ohio; Ohio River; the Kanawha from West Virginia, including the Splint, Bituminous and Cannel; and the Anthracite from Pennsylvania.

Of Anthracite coal, the quantity consumed in this city is small, not exceeding during the past year, 282,578 bushels. The price delivered to dealers is about \$9.75 per ton.

The shipments of coal from this city to interior towns have increased until they amount to 5,096,100 bushels against in 1874-75, 5,002,500 bushels, 5,933,100 bushels in 1873-74, and 4,472,400 bushels in 1872-3.

The following table will show the number of bushels of coal of all kinds, received at Cincinnati, for the years named.

Years.	Bushels.	Years.	Bushels.
1853-54.....	8,158,000	1864-65 .....	16,467,023
1854-55 .....	10,356,000	1865-66 .....	18,022,990
1855-56 .....	7,500,000	1866-67 .....	18,446,226
1856-57 .....	14,500,000	1867-68 .....	17,500,000
1857-58 .....	15,000,000	1868-69 .....	25,500,000
1858-59 .....	12,392,701	1869-70 .....	30,300,000
1859-60 .....	14,600,000	1870-71 .....	22,972,000
1860-61 .....	12,500,000	1871-72 .....	30,790,796
1861-62 .....	8,500,000	1872-73 .....	37,274,497
1862-63 .....	8,000,000	1873-74.....	35,234,834
1863-64 .....	15,975,366	1874-75 .....	35,360,300
1875-76 .....	40,183,317		

It is safe to calculate the bushel at eighty pounds, which would give twenty-eight to the ton of 2,240 lbs.

## DETAILS FOR THE SEASON 1875-76.

	Bushels.
Youghiogheny.....	27,017,592
Ohio River.....	4,400,792
Kanawha River .....	6,004,675
Muskingum Valley.....	177,730
Hocking Valley.....	1,350,000
Kentucky Cannel.....	409,358
Anthracite .....	282,578
Hocking and Muskingum Coal, not elsewhere included.....	540,592

Total for the season.....40,183,317

## SAN FRANCISCO, CAL.

The statements given below will serve to indicate the increased consumption of the several varieties of coal, at San Francisco. The principal source

of supply are, from Mount Diablo, in the immediate vicinity, from Coos Bay and Bellingham Bay in Oregon, and Seattle in Washington Territories, from Vancouver Island, from Australia and Great Britain, as also Cumberland and Anthracite, from the Atlantic Coast; coal has also been received in small quantities from Chili, Sitka, Alaska and Japan.

Years.	Total Receipts.	Years.	Total Receipts.
1860.....	77,635	1868.....	282,025
1861.....	116,245	1869.....	328,973
1862.....	120,545	1870.....	320,493
1863.....	135,550	1871.....	315,194
1864.....	167,298	1872.....	434,467
1865.....	150,147	1873.....	454,582
1866.....	192,601	1874.....	531,947
1867.....	248,925	1875.....	538,209
1876.....	648,388.		

Details of business for the year 1876 are as below:—

<b>FOREIGN.</b>	Australian .....	131,695 tons.
	English.....	121,948 tons.
	Vancouver Island.....	100,965 tons.
	Chili.....	3,150 tons.
<b>DOMESTIC.</b>	Mount Diabo.....	108,078 tons.
	Coos Bay.....	41,286 tons.
	Bellingham Bay.....	21,335 tons.
	Seattle.....	95,314 tons.
	Rocky Mountain .....	226 tons.
<b>EASTERN.</b>	Cumberland.....	12,520 tons.
	Anthracite.....	11,871 tons.

Making the total of.....648,388 tons.

The ton weight is that of 2240 lbs.—

The following is of interest, as showing the relative value of the coals found on the Pacific coast compared with the coal from the Cumberland region in Maryland:

	A.	B.	C.	D.	E.	F.
Alaska .....	7.94	7.96	60.0	40.0	12.3	5.41
Coos Bay.....	10.24	7.35	60.7	39.3	6.2	6.91
Seattle .....	8.38	8.57	63.0	37.0	16.6	5.71
Black Diamond.....	8.38	8.73	51.6	48.4	8.0	5.71
Bellingham Bay.....	10.58	5.51	67.0	33.0	16.0	7.21
Anthracite .....	7.40	.....	95.6	4.4	7.2	5.04
Cumberland, Maryland.....	13.92	3.52	88.2	11.8	3.2	9.48

EXPLANATION.—A, heating power, one pound water; B, sulphur to ton, in pounds; C, coke per cent; D, Volatile matter; E, Ash per cent; F, relative value per pound.

## BALTIMORE, MD.

At this city an extensive business in coal, both Anthracite and Bituminous, is done. Locust Point, the terminus of the Baltimore and Ohio Railroad, on the environs of this fine city, is the shipping point for the Bituminous coal from the Cumberland region of Maryland, the Gas coal regions of West Virginia, the Somerset county mines and the Youghiogheny Gas coal of Pennsylvania.

The highest price at which the Cumberland coal has been sold at Baltimore, was in March 1865, when the price was \$14 per ton; it rapidly declined, until, in December of the same year, the price was but \$7 40 per ton. The trade in Anthracite at present is entirely local, none being shipped from Baltimore to other and more distant points.

There are some 350,000 tons of Anthracite received yearly at Baltimore, by the following routes: From Millersburg, Pa., 112 miles, the Lykens Valley Red Ash; from Sunbury, Pa., 138 miles, the White Ash; by Susquehanna tide water canal; from Port Richmond, Philadelphia, via River and Canal. Little or no Lehigh coal reaches Baltimore. All the sales are 2,240 pounds to the ton. Anthracite sold as high as \$13.50 per ton for Lump coal, in May, 1865.

The gross rates of transportation, on coal for shipment at Locust Point over the Baltimore and Ohio Railroad, made at the opening of this years business, were as below:

Cumberland to Locust Point.....	\$1 62
Piedmont to Locust Point.....	1.90
Newburg to Locust Point .....	3.82
Clarksburg and Fairmount to Locust Point.....	4.32

Per ton of 2,000 lbs., with a drawback off Gas coal reshipped North and East.

The shipments from Baltimore of Cumberland coal to foreign ports were as below:

1871.....	20,207	1874.....	70,675
1872.....	54,363	1875.....	33,460
1873.....	59,546	1876.....	27,336

The Northern Central Railroad carried to this city the following amount of Anthracite coal, in the years named.

1872.....	244,757	1874.....	232,938
1873.....	242,754	1875.....	276,784
1876.....			263,954

There is something like one hundred thousand tons of Gas coal received and shipped at this port annually; it was formerly, more than double this amount, but the rate of freight, per B. & O., has lately been so high, as to



throw the trade into the hands of operators in Pennsylvania; the coal received and shipped consists of Clarksburg and Fairmount, W. Va.; and the Youghiogheny, received from Western Pennsylvania, by the Pittsburgh and Connellsville branch of the Baltimore and Ohio Railroad.

The Pennsylvania Railroad began to carry the Bituminous coal from the Clearfield region of Pennsylvania to Baltimore in 1875, by its Northern Central line, and there has been quite a local and shipping business for this quality of coal, developed in this vicinity.

The following schedule shows the business of the Baltimore and Ohio Railroad Company, giving the disposition of the coal that paid freight (coal for the use of the company not included):

Fiscal Years.	Received at Locust Point.	To Balti- more.	Line Trade.
1862.....	150,987	8,740	978
1863.....	277,505	26,106	3,936
1864.....	302,277	56,181	1,103
1865.....	353,434	49,396	5,340
1866.....	620,888	77,856	20,967
1867.....	629,946	58,377	7,615
1868.....	696,465	29,766	29,780
1869.....	1,187,366	136,704	33,910
1870.....	1,069,390	113,929	36,319
1871.....	1,438,816	113,286	39,500
1872.....	1,482,240	60,630	118,389
1873.....	1,806,829	65,694	147,195
1874.....	1,407,377	—	—
1875.....	1,375,297	54,124	90,468
1876.....	1,068,754	47,059	71,476

The coal business of the Baltimore and Ohio Company, on main stem, was 1,596,894 tons, (including 409,605 tons for the company use,) and on Pittsburgh division 797,630 tons, for the first nine months of 1876, and on the Trans-Ohio divisions 228,834 tons, making the grand total of 2,623-358 tons. The year of the company ends September 30th.

### RICHMOND, VA.

This city is assuming considerable importance through the efforts of the shippers along the line of Chesapeake and Ohio Railroad, to build up a trade for their coal at the east; if the railway company were in a position to make lower rates of tolls, an increased business might be done, as the Steam, Gas and Splint coals, produced upon property located upon and near to this route, are of the best quality. They stand unrivalled for all

the various purposes for which fuel is required. We append statistics of the total coal business, of the Chesapeake and Ohio Railroad.

Quality.	Tons in 1874.	Tons in 1875.	Tons in 1876.
Cannel.....	26,225	33,840	45,050
Splint and Bituminous .....	114,605	148,762	165,530
Coke.....	1,930	8,767	6,679
Totals.....	141,760	191,369	217,259

The shipments from the port of Richmond, during the year 1876.

Cannelton.....	33,912	33,134
Peytona.....	18,648	11,151
Coal Valley.....	10,772	8,914
Blacksburg.....	5,467	7,288

There was also some 7,200 tons of Kanawha coal shipped by other parties, in small lots. The amount of Chesterfield county coal, (per Richmond and Danville road,) received was 16,321 tons, of which 9,351 tons were shipped to other ports and places; there was 3,513 tons of the same quality received here, via Richmond and Petersburg road; the receipts of Cumberland and Anthracite amounted to 40,983 tons, a large decrease from former years; the tonnage of Virginia coal received by canal was 10,929 tons.

## PITTSBURGH, PA.

The amount of business that was done at this city in coal and coke, including that sent to other points, amounted in 1876 to 4,424,044 tons (of 2,000 pounds).

The rapid growth of the coke trade of Pittsburgh and vicinity is a most significant illustration of its industrial development. Of this trade, what is known as Connellsville coke forms a large part, and will continue to do so. It is mined in Fayette county, Pa. It is stated that an acre will yield, over and above the pillars, if properly mined, 13,300 tons. It weighs 80 lbs. to a bushel, and when properly coked, 100 bushels of coal produce 125 bushels of coke, and the coke weighs 40 pounds to a bushel; that is, a given quantity of the coal gains one quarter in bulk and loses three eighths of its weight, or 100 pounds of coal makes 62½ pounds of coke. The coke has become very celebrated not only about Pittsburgh, but throughout the Western States, where it is extensively used for foundry purposes in melting pig iron, selling in competition with Lehigh coal. It is used in blast furnaces for smelting iron from the ore, and is sometimes mixed with the Western coals. It is an excellent fuel for locomotive use. Its freedom from sulphur has given this coke the reputation of being the best known.

An analysis made by J. B. Britton of a sample of Connellsville coke, average of forty-nine pieces, shows:

Moisture .....	.49	Sulphur.....	.69
Ash.....	11.33	Phosphoric Acid.....	.03
Carbon.....			87.46

The ash of the coke contained 47 per cent. of silica and 47 per cent. of alumina.

The receipts during the years 1875 and 1876 are shown in the following schedule.

#### COAL RECEIPTS.

	Tons—1875.	Tons—1876.
Pennsylvania Railroad.....	331,843	220,000
Pittsburgh & Connelsville R. R. ....	325,000	55,490
P. C. & St. Louis R. ....	249,891	294,408
Saw Mill Run R. R. ....	90,049	148,654
P. V. & C. R. R. ....	43,890	68,796
P. & Castle Shannon R. R. ....	97,313	94,741
Alleghany Valley R. R. ....	271,725	190,821
West Penn. R. R. ....	150,000	192,685
Total by rail .....	1,559,711	1,267,595
By Slackwater .....	2,046,967	2,798,333
Grand Total .....	3,606,678	4,065,928

#### COKE RECEIPTS.

	Tons—1875.	Tons—1876.
Pennsylvania R. R. ....	422,903	83,050
Pittsburgh & Connelsville R. R. ....	550,000	18,730
West Penn. ....	45,000	53,170
Slackwater. ....	38,308	203,166
Total.....	1,056,211	358,116

### NEW ORLEANS, LA.

The coal brought to this market is almost exclusively Pittsburgh coal. The flats and barges are towed by powerful towboats built expressly for that purpose. The towing between Pittsburgh and Louisville depends on the state of the river. When the stage of water is too low for navigation, which it frequently is for weeks, and even months, the supplies at the lower points become deficient and prices naturally advance, often reaching very high prices. The coal flats and barges sent to New Orleans are generally dropped at Willow Grove, near Greenville, just above the city, where they are superintended for the owners or agents. When a boat or barge is wanted a small city tugboat is sent to tow it to the city, or to its destination on the coast.



The largest amount of coal consumed in the past six years, was 301,555 tons in 1869, and the least, 211,727 tons in 1875.

Messrs. C. A. Miltenberger & Co., give the following as the consumption of Pittsburgh coal at this port:

Year.	Bbls.	Year.	Bbls.
1869.....	3,317,000	1873.....	2,821,500
1870.....	3,203,500	1874.....	2,749,500
1871.....	3,112,000	1875.....	2,448,000
1872.....	2,991,500	1876.....	2,802,700

In addition to the figures for 1876, add some 84,000 bbls, of St. Bernard coal, from Kentucky. Boats average 9,000 bbls. Barges 4,500 bbls. French Creeks 3,400 bbls. It is estimated that eleven barrels make a ton of 2,000 lbs. The distance from Pittsburgh to New Orleans is some 2,000 miles, and the rate of freight is about  $3\frac{1}{2}$  cts. per bushel.

### MOBILE, ALA.

The receipts of coal at this port are very small, the demand being principally for household purposes. The boats, presses and manufactories continue to use pine wood, which can be freely obtained at about \$3 00 per cord—making a fuel so cheap as to prevent the substitution of coal until it can be furnished at a considerable reduction from present rates. Although samples of the Alabama coal have been sent to Mexico, Cuba and St. Thomas, there has been nothing done as yet, looking to an increased trade. The railroads freight the Alabama coal at as low a figure as they can afford, yet the cost is too high for successful competition with the Cumberland and Anthracite coals of America, and the coal from Great Britain or the Nova Scotia Provinces. The total coal business of the port, in 1872 was 9,920 tons; in 1873, 9,235 tons; in 1874, 6,984 tons; for 1875, 1,987 tons Alabama coal, and 3,179 tons English and Anthracite; for 1876, 1,105 tons Alabama, and 4,278 tons English and Anthracite. The improvement of the navigable streams that flow through the coal fields, to the Gulf of Mexico, would allow a large business to be done from this port, in the coals that are so abundant in the State of Alabama.

### CLEVELAND, OHIO.

This city receives a fine and varied assortment of Bituminous coal. A great many coal basins—in fact, nearly all the Ohio formation, as well as most of the coals lying west of the Allegheny Mountains, in Pennsylvania—here find a market and a distributing point for the West, Northwest, Eastern and Canada trade.

The great number of vessels employed in the iron ore and lumber trade naturally seek coal as a back freight for ballast, which enables Cleveland to place coal in distant ports, like Chicago, Milwaukee and on Lake Superior, at mere nominal rates. The bulk of the business has been developed within the last fifteen years, and, taking the rapid growth of the manufacturing interests in the West into consideration, it is safe to presume that the trade has not yet reached its ultimate proportions.

The total receipts of coal at Cleveland from 1828 to 1852 amounted to 662,862 tons; having increased from thirty tons in 1828, to 137,926 tons in 1852; the coal being mined in the districts named below.

Year.	District.	Tons for the Year.
1828	Tallmadge.....	30
1829	Tallmadge.....	708
1830	Tallmadge.....	1,178
1840	Tallmadge, New Castle, Trenton.....	6,023
1850	Tallmadge, Clinton, New Castle, Youngstown, Cuyahoga Falls, Girard and Rochester.....	53,850
1851	Tallmadge, Clinton, New Castle, Youngstown, Cuyahoga Falls, Girard and Rochester.....	107,135
1852	Tallmadge, Clinton, New Castle, Youngstown, Cuyahoga Falls, Girard and Rochester.....	137,926

The canal from Akron was opened July 4, 1828, and during that year the thirty tons of coal sent to Cleveland was received by this canal route. The coal was taken from the mines to the canal with teams, to be shipped, and the business was continued in this way until 1832, when the canal reached the coal fields near Massillon, which were on its banks. The receipts by this route represents the consumption of coal at Cleveland up to 1838. It was not until after this, and after the Briar Hill coal began to reach this place, in 1843, that lake steamers could be induced to use it. Since 1845 it has supplanted wood on the steamers of the lower lakes.

Until 1845 the entire trade of the lakes in Bituminous coal was in the hands of Cleveland dealers. About this time, possibly a year or two earlier, Erie began to ship coal, the joint receipts from the interior at the two places being only 45,136 tons.

We are not prepared to give official figures of the coal trade of this city, as their collection does not appear to be of any moment with the various companies. We are therefore compelled to make estimates, for some years. the following will serve to show the growth of the trade.

Year.	Tons.	Year.	Tons.
1865.....	465,550	1871.....	1,165,940
1866.....	583,407	1872.....	1,348,160
1867.....	668,026	1873.....	1,599,212
1868.....	759,104	1874.....	1,100,000
1869.....	922,757	1875.....	1,250,000
1870.....	904,600	1876.....	1,100,000

The ton designated is that of 2,000 lbs. It is safe to estimate that one half of the receipts as noted above, are sent to outside ports and places, via the lakes; the following will serve to show the destination.

	1875.	1876.
To ports in British Provinces.....	140,637	156,857
To Domestic ports.....	529,211	362,834

## COLORADO.

The area of land known to be rich in lignite coal deposits in Colorado, is about 7,200 square miles, lying in various parts of the Territory, on both sides of the main range. There can hardly be a doubt but that this extent will be largely increased in years to come, for new discoveries are constantly being made upon the foot-hills and plains.

Separated under heads depending more upon their geographical position than upon the character of the fuel, we find:

- |                              |                                 |
|------------------------------|---------------------------------|
| 1. The Northern mines.       | 2. The Eastern foot-hill mines. |
| 3. The Southern mines.       | 4. The Summit county mines.     |
| 5. The Conejos county mines. |                                 |

Of the first but little is known. Weld and Larrimer counties are undoubtedly underlain by veins of lignite similar to those of Wyoming, which are at present furnishing an excellent fuel for steam engines, domestic purposes, and for some metallurgical processes. Coke made from the product of the Wyoming coal fields has been tried at both Golden and Denver for smelting silver and gold ores, and though discarded in favor of Pennsylvania coke, is considered to be a fair fuel.

The eastern foot-hill mines embrace outcroppings in Boulder and Jefferson counties, nearly all of which have been known since the early days. They are producing at present three-fifths of all the coal mined in Colorado, which is about 120,000 tons, being located nearer the centre of population than any of the other fields.

The main workings lie mostly upon the north side of Ralston Creek, which has cut through the bed and exposed its outcroppings very markedly on either side. Nearly 2,000 feet of the vein is opened. The coal is a very good sample of the product of all the foot-hill mines. It is an altered lignite that burns freely, and crumbles quickly on exposure to the rain or moist air; burns well under the boiler and in the grate, and answers excellently for nearly all the uses to which mineral fuel is put.

The following is an analysis made in 1871 by E. W. Rollins, of the Massachusetts Institute of Technology, Boston.

Hydrogen.....	4.00 per cent.
Carbon.....	66.50 per cent.
Ash.....	7.05 per cent.
Oxygen, Nitrogen and Sulphur.....	22.45 per cent.
	100.00

East of Denver, along the line of the Kansas Pacific, indications of coal are not wanting. The same formation that is found along the foot-hills, tilted up in a nearly vertical position, underlies the whole of eastern



Colorado, which is one vast lignite basin, containing stores of this truly precious mineral.

The southern mines embrace those of Trinidad and Fremont county, and furnish a class of mineral entirely different from any yet found in the Territory. The latter are the oldest mines and the best known, and the demand for it is great, not only for household use, but for the manufacture of gas in Denver.

The Summit county mines are not worked, as they have only lately been brought into notice. They are located on the divide between the Bear and White Rivers, and consist of several seams varying from five to fifteen feet in thickness, which owing to the contorted strata, lie in a variety of positions, from a strict horizontal to a perfect perpendicular. Above is a stratum of sandstone varying from one to three hundred feet in thickness. The coal is of two kinds, one a hard lignite and the other similar to what is called albertite.

The Conejos beds are also new discoveries of which but little is known. Sufficient outcroppings of coal, however, have been noticed below, and west of Las Animas or Elbert, to indicate the existence of extensive lignite deposits there. The mines are hardly opened yet, but situated as they are, not more than thirty miles south of the centre of the San Juan gold and silver district, it will be but a short time before their product will be called for, should they prove at all suitable for metallurgical purposes.

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## INDIANA.

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The area of the Indiana coal measures approximates one fifth of the entire State, and embraces the counties of Perry, Spencer, Warwick, Posey, Vanderberg, Gibson, Pike, Dubois, Daviess, Knox, Martin, Sullivan, Greene, Clay, Vigo, Parke, Vermillion and Fountain. The most important coals, from a manufacturing point of view, are those known as the "lower block" 3.8 thick, the "main block" 4.4 thick, and "upper block" 1.10 thick. Block coal has a laminated structure, and is composed of alternate thin layers of vitreous dull black coal and fibrous mineral charcoal. It splits readily into sheets, breaking with difficulty in the opposite direction; on burning, it scarcely swells, or changes form, and never cakes or runs together. What the celebrated English chemist, Mushet, said about a certain Welsh coal, is equally applicable to the block coal of Indiana. To the purity of Splint coal it unites all the softness and combustibility of wood, and the effects produced by it in the blast furnace, either as to the quality or quantity of

iron, far exceed everything in the manufacture of that metal with charcoal. From careful assays, it is ascertained that this coal gives from 56 to 62 per cent. of fixed carbon, a small amount of water and a small amount of ash. Dr. E. T. Cox, the State geologist, gives this coal an exceptional character as an iron smelting fuel, and reports a ton of pig iron as being made with 4,250 pounds of block coal.

The coal in Clay County is favorably known as an iron-smelting fuel, and we append a description of its qualities. "There are two veins of coal, the upper vein averaging about three feet ten inches in thickness, and the lower one averaging about four feet. The roof is principally sand rock, slate, and slate and sand rock mixed. Fire and potters' clay of good quality underlie the coal. The average depth to the first vein is about forty-five feet from the surface, and the second or lower vein is found at an average depth of seventy-five to eighty feet. The coal is free from slate and sulphur. It burns freely, and leaves a soft, fine white ash, similar to wood ash, and no clinkers." For domestic and steam purposes, the coal is largely used in Chicago, Ill; Indianapolis, Ind; Kalamazoo, Mich.; and the towns and stations along the lines of most of the railroads leading from this coal district, among which may be mentioned the St. Louis, Vandalia, Terre Haute and Indianapolis Railroad; the Jeffersonville, Madison and Indianapolis Railroad; the Indianapolis and St. Louis Railroad; the Louisville, New Albany and Chicago Railroad; the Cincinnati, Lafayette and Chicago Railroad; the Lake Shore and Michigan Southern Railroad; the Indianapolis, Decatur and Springfield Railroad; and the Michigan Central Railroad.

In the block coal zone of the Indiana coal fields there are as many as eight seams of non-caking coal, four of which are of good workable thickness over a portion of the field. These are I, G, F and A, which together, have a maximum thickness of fifteen feet; and by including the other four seams, we have six feet more, making a total of twenty-one feet of block coal.

The coal of Parke County is favorably reported on for the manufacture of iron. It is a block coal, averaging five feet in thickness, weighing seventy seven pounds to the cubic foot, and gives by analysis 62.5 fixed carbon, 31.00 volatile matter, 4.05 water, and 2 per cent. of ash. The estimated area is about 300 square miles of workable coal.

The "upper block" at Washington, in Daviess County, is extensively mined, and meets with a ready market at St. Louis, and all the towns on the Ohio and Mississippi Railroad. Its specific gravity is 1.294; a cubic foot weighs 80.87 pounds; by analysis it yields: fixed carbon, 60.00; ash, 4.50; volatile matter, 35.50. The coal worked is known as L, a five foot

seam of Bituminous, an excellent caking coal, free from impurities, and may be handled and stocked without much loss; it has been used for gas making at St. Louis, and is a three foot ten inch seam of very pure coal, jet black, of cubical fracture, and bears a good reputation as a fuel, for general uses.

All the coals of the Indiana field belong to the class known as bituminous. The principal varieties may be designated as follows:

Caking coal, long flame, gas and smith coal, fat coal.

Semi-caking coal, long flame.

Block coal, non-caking coal, long flame, dry burning coal, furnace coal.

Semi-block coal, long flame.

Cannel coal, long bright flame, dry burning, gas coal.

The Daviess county, cannel coal, at the base is firmly cemented to a bed of brilliant black caking coal totally unlike the former in chemical composition.

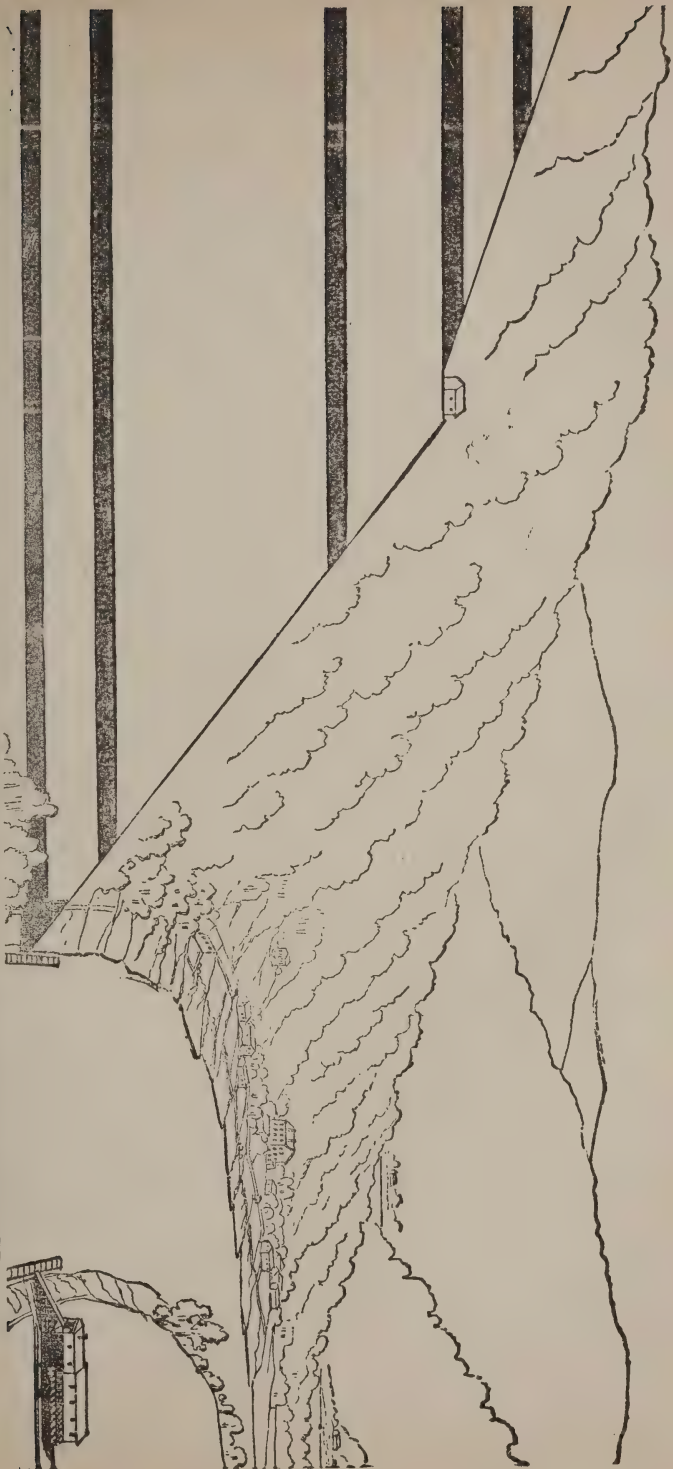
Prof. Cox remarks that this is the most remarkable seam of coal of which he has any knowledge, and when taken in connection with the Breckenridge coal, sets at defiance the theory that cannel is due to a flora distinct from that which, in general, furnished anthracite and bituminous coals. The Indiana cannel, like the Breckenridge of Kentucky, is rich in carbon oils and gas. It contains from 7 to 10½ per cent. of very white ash, and is remarkably free from pyrites. The quantity of ash greatly exceeds what we find in the caking and block coals of Indiana, though less than is found in the Breckenridge coal. In every case the ash is in excess of what could be derived from any species of plants known to botanists and in a great measure must have been furnished by water, either turbid or holding in solution mineral matter. If by the latter, then its presence must have had a marked influence in determining the character of the chemical change from wood to coal.

The following analysis will serve to show the character of some of the Indiana coals.

	Fixed Carbon.	Vol. Matter.	Water.	Ash.
Fountain County .....	54.5	36.0	5.0	4.5
Vanderberg County.....	48.5	42.0	3.5	6.0
Warwick County .....	49.5	41.5	3.5	5.5
Posey County .....	51.0	39.5	4.0	5.5
Sullivan County .....	55.0	40.0	3.5	1.5
Daviess County .....	53.5	36.0	5.5	5.0
Vermilion County.....	46.0	44.0	5.5	4.5
Parke County.....	46.5	46.0	4.0	3.5
Montgomery County .....	52.0	41.5	3.0	3.5
Clay County .....	61.5	32.5	3.5	2.5
Owen County .....	57.5	38.5	2.0	2.0
Greene County.....	63.0	29.5	7.0	0.5



General view of the country on the Kanawha River, at Cannelton, W. Va.





## WEST VIRGINIA.

The coal measures of West Virginia underlay nearly sixteen thousand square mile- of territory, of which, what are known as the Kanawha and New River Valleys, traversed by the Chesapeake & Ohio railroad, hold eight thousand. Several varieties of coal occur. among which are :—Cannel, Splint, Gas, and Bituminous. Of the Bituminous there are seams of different degrees of hardness and texture, from the friable coking coal, similar to the best Newcastle (England) coals, to the harder Splint coals, with regular cleavage, similar to the Youghiogheny coals so largely in demand in our Western and Southern cities ; of so compact a nature that it can be used in an iron blast furnace in its raw state.

The Bituminous coals are excellent steam raising fuels, and have been used in steamers, railways, and under stationary engines with good results. The Gas coal seam is identical with the Kittaning Gas coal bed, mined on the Allegheny river, in Pennsylvania, and have been used in the eastern and western markets with most satisfactory results.

The value and importance of the Kanawha Coal District, as a new source of supply from which good caking coals can be obtained, is beginning to be understood and appreciated by gas manufacturers.

These coals have established a good reputation where they have been tested and used, for the quantity, purity and illuminating power of the gas which they produce.

A series of practical tests, recently made in the apparatus of a gas light company, from ordinary average samples, of one ton (2,240 lbs.) each from five different mines, and with the regular working charges of 224 lbs., as observed and certified by Professor P. de P. Ricketts, of the School of Mines, give the following average results per ton of 2,240 lbs., viz. :—

	Cubic Feet.	Candle Power.
Standard yield.....	10,000	17,414
Maximum yield.....	12,428	16,010

Coke, 33 4-5 bushels, weighing 1,518 3-10 lbs., and of good quality.

The chemical analyses of the above five samples, by Professor Ricketts give the following average results, viz. :

	Per cent.
Volatile Matter.....	35.75
Fixed Carbon.....	56.65
Ash.....	5.18
Sulphur.....	1.32
Moisture.....	1.08
Specific Gravity.....	12.79
Weight of one cubic foot.....	79.78 lbs.

The capacity of the mines from which gas coals are now being shipped,



is about 150,000 tons per annum, and as the seams traverse a large area, the supply can be largely and rapidly increased.

On approaching from the eastward, the bituminous coal seams of West Virginia are first found in the tops of the mountain ranges overlooking New river, in Summers and Raleigh counties, embracing only the lowest seams of what are known as the lower coal measures. The Big Sewell mountain a prominent elevation in West Virginia, towering some 2,800 feet above sea level, and 1,500 feet above New river, forms the south-eastern edge of the "Upper Ohio coal basin." All the territory drained by the Kanawha and its tributaries, between the Falls of the Kanawha and Campbell's creek, contains the seams of coal within workable reach, above water level, or by shafts at no great depth. It can be mined very cheaply; and the quantity available is vast beyond conception. The top seam of the lower coal measures disappears beneath the Kanawha, at its confluence with the Elk river, at Charleston; while some of the coal seams reappear up the valleys formed by the Elk and Coal rivers. Cabin creek, Elk river, and Coal river are three considerable tributaries to the Kanawha, penetrating the country for long distances, and bringing into convenient working position thousands of acres of valuable coal land.

At Quinnimont, on the line of the Chesapeake and Ohio Railroad, 295 miles west of Richmond, are the works of the New River Car Co. Analysis made by J. B. Britton, gave the following results:

Coal.		Coke run of mines.		Coke from slack.
Fixed Carbon.....	75.89	Carbon.....	93.85	91.72
Volatile Matter.....	18.19	Ash.....	5.84	5.09
Ash.....	4.98	Sulphur.....	0.31	0.48
Moisture.....	0.74	Water.....	—	2.71

This company is mining a vein about  $3\frac{1}{2}$  feet Bituminous coal, using the coke in their blast furnace, and for the manufacture of car wheels. The coke is fully equal to the famous Connellsville, of Pennsylvania.

At Nuttallburg, 316 miles west from Richmond, John Nuttall, Esq., is mining a Bituminous coal, from the lower coal measures. The vein is  $3\frac{1}{2}$  feet thick, far above water level. The coal finds a market East and West for steam purposes. The slack is made into coke, and it has been used for iron smelting, and in foundries with great success, being pronounced by those who have used it, equal to the best Connellsville.

At Hawk's Nest, 325 miles west from Richmond, are the works of the Gauley-Kanawha Co. This coal was analyzed at the School of Mines, in London, with the following result:—Carbon, 83.31; hydrogen, 5.54; oxygen and nitrogen, 6.86; sulphur, 0.74; ash, 2.15; water, 1.40.

At Canneiton, 344 miles west from Richmond, are the mines of the Can

nelton Coal Co., the product of which is so well known in the eastern and western markets. In ascending order, from the river level, the following principal seams of coal are found :—First, about 20 feet above the river, 4 ft. 6 in. of a superior quality of Bituminous coal; at 100 feet is a 7 foot seam of first-class Gas coal; at 600 feet is a seam of 5 feet of superior Splint coal, unsurpassed as an iron making fuel; at 700 feet, is a seam of 3½ ft. Cannel. and 2½ ft. Semi-Cannel. The former is the celebrated Cannelton Cannel; the Semi-Cannel somewhat resembles the Splint coal of seam number three, is very valuable for house use, and has been satisfactorily used for gas making.

About eight hundred feet above the river, and above the “Flint Ledge,” is a seam of superior Block coal, six feet in thickness, of great value for steam and iron making. In addition there are several smaller seams, varying from twelve to thirty inches in thickness, located between seams number two and three.

An analysis of the Cannelton Cannel, made by the Manhattan Gas Light Co., of New York, gave—Volatile matter, 58.0; fixed carbon, 23.5; ash, 18.5. At standard (10,000 cubic feet) it gave an illuminating power of 64.54 candles, or 12.025 cubic feet of 45.60 candles. Weight of 32 bushels of coke, 1320 pounds.

Between Cannelton and Coalburg, within a distance of about 10 miles, are located the principal Gas coal mines of this region now in operation

In the vicinity of Coalburg, 354 miles west from Richmond, are several operations. working coal which is highly appreciated by iron-masters as an excellent fuel, in its raw state, in the reduction of iron ores, and also for steam and domestic purposes in the markets reached by the Kanawha and Ohio rivers. Analyses made of the Bituminous coal from this locality show: Fixed carbon, 56.0 to 62.6; volatile matter, 40.5 to 33.3; ash, 1.5 to 1.8; water, 2.0 to 2.5.

The principal coals of the upper series are known as the Pittsburgh, Redstone, Sewickley, Waynesburg and Washington, having received these names from localities in Pennsylvania. Besides these, several other beds occur, but as they barely cross the line from Pennsylvania into West Virginia, and never become of any value in that State or this, it is unnecessary to make any further reference to them here. Of all these, the Pittsburgh alone maintains its importance throughout, as far as the examinations go. The available area of this bed, therefore, is of great economical interest.

At Peytona, in Boone county, are the mines of the Peytona Cannel Coal Co., located on Coal river, about thirty-five miles from its junction with the Great Kanawha river, 380 miles west from Richmond. The coal is transported by slackwater navigation to the mouth of Coal river, where it is transferred to the cars of the Chesapeake and Ohio R. R. The greater part of the product of the mines has been forwarded by the Kanawha and Ohio rivers to all of the important places bordering these rivers and their tributaries. The coal is also sold in the Eastern markets, where it is esteemed for gas purposes and as a grate fuel. We give place to an analysis of this coal made by the Manhattan Company. Volatile matter, 46.0; fixed carbon, 44.0; ash, 13.0. At 10,000 feet per ton, standard yield, the illuminating power is 43.12 candles, or 13,200 cubic feet of 32.66 candles. Weight of coke, 32 bushels=1380 pounds.

Many new company and individual enterprises are being located in this region, and all that we have said as to the resources of this section of the Union, is in a fair way of being recognized.

As to an outlet from this region we have the Chesapeake and Ohio Railway eastward, the building of which has done so much to open up this district. Their charges for carrying coal are extremely liberal, and now that a more decided movement seems to have been inaugurated, looking to the development of the coal trade, in time it is destined to carry to tide-water considerable quantities of coal; the figures for a term of years are given in the review of the trade of Richmond, Va. See also item upon the improvements of the Kanawha River, under "Interesting Facts and Figures."

## MISSOURI.

The coal measures of Missouri comprise an area of about 22,995 square miles, including 160 square miles in St. Louis county, 80 in St. Charles, and a few outliers in Lincoln and Warren; the remainder in northwest and western Missouri. This includes 8,406 square miles of upper or barren measures, about 2,000 square miles of exposed middle, and 12,420 of lower measures. The boundary between the middle and lower coal is not well defined, but is limited by a thick-bedded, coarse, micaceous sandstone, sometimes of no great extent, at other times of great thickness. We suppose it to enter the State in the west part of Bates county, and to pass thence via Butler to Chilhomee in Johnson county; thence northwardly four miles west of Warrensburgh to four miles east of (?) Aulville, Lafayette county; thence, irregularly meandering through Lafayette county, crossing the Missouri river, passing to ten miles east of Carrollton, Carroll county; thence to the southeast corner of Livingston county, from which point it bears northeast to the centre of Linn county, and thence, northward. The southern



and eastern boundary of the lower coal measures is as follows: (through Barton, Bates, Vernon and St. Clair, the boundary has not yet been well defined;) entering the State in Barton, it passes northeast through the eastern part of Vernon; it enters St. Clair about one half way up, on its western line, thence, meanders eastward to a point a few miles north of Osceola; thence, northward to within eight miles of Clinton, Henry county, thence northeast to the east line of Henry county; thence northwardly, with occasional variations of sandstones as much as eight miles east to Brownsville, Saline county; thence north-eastward to Marshall and thence to Miami. On the north side of the river it passes eastward, from a point opposite Arrow Rock, to the east line of Howard county; and thence, in a meandering course via Columbia, Boone county, New Bloomfield and Fulton, Callaway county, to the northeast corner of Callaway; thence, north-eastwardly to a point three miles west of the northeast corner of Montgomery county; thence northwest to near the mouth of Lick creek, Ralls county: thence, southwest to Mexico, Audrain county; from thence, to the northwest corner of Monroe county, thence, irregularly trending northward to the northwest corner of Knox county; thence, to a point on the north line of Lewis county, about 12 miles west of the Mississippi river; thence northwardly to the Des Moines river, on the north line of the State of Missouri. East of this, are small outliers in Montgomery, Warren, Lincoln and St. Louis counties, and perhaps others in southwest Missouri.

The aggregate thickness of the upper coal measures is 1,317 feet, including only about 4 feet of coal, of which there are two seams of one foot in thickness; the others are very thin seams or mere streaks. The middle coal measures include a total thickness of about 324 feet, in which are embraced about 7 feet of coal, including two workable seams of 21 and 24 inches; one other of one foot, that is worked under favorable circumstances, and six seams too thin to work. The lower measures include from 250 to 300 feet, embracing about five workable seams of coal, varying in thickness from  $1\frac{1}{2}$  to  $4\frac{1}{2}$  feet, and thin seams varying from 6 to 11 inches, and several minor seams and streaks; in all 13 feet 6 inches of coal. We therefore have in Missouri nearly 1,900 feet of coal measures with a total aggregate of 24 feet 6 inches of coal. The thinner seams of coal are not often mined, except in localities remote from railroad transportation. The coal from thicker seams (those from  $1\frac{1}{2}$  to 2 and 4 feet) is generally sold at 10 cents per bushel at the mines. The thin seam, 10 to 14 inches on Nodaway river, is sold at over 20 cents per bushel at the mines. The reason of this is the difficulty of mining (there being so much superfluous material to be removed) and the remoteness of other coals. Miners seem to prefer to work a bed of 2 to  $2\frac{1}{2}$  feet in thickness. We would consider all beds over

18 inches thick as workable coals. The estimated area, where such may be reached within 200 feet from the surface, is about 7,000 square miles. The coal is bituminous, and the product may be safely estimated at 800,000 tons.

The following is a condensed vertical section of the coal measures:

No.	Locality.
1—339 feet, including 230 feet above the connected section.....	
2—12 inches coal.....	Holt, west part of Nodaway and northwardly; also White Cloud, Kansas.
3—392 feet.....	
4—12 inches coal.....	Andrew, Buchanan, De Kalk, Gentry and Platte
5—207 feet.....	
6—10 inches coal.....	Platte county.
7—379 feet to base of upper coal measures.....	
8—3 inches coal at top of middle coal measures.....	Pleasant Hill, Missouri City and Princeton Mercer County.
9—164 feet.....	
10—1 foot coal.....	Cass, Johnson, Lafayette and Livingston, also Grundy.
11—70 feet.....	
12—22 feet (Lexington coal).....	Lafayette, Johnson and Ray.
13—36 feet.....	
14—7 inches coal.....	Lafayette and Ray.
15—14 feet.....	
16—21 inches coal.....	Lafayette, Johnson, Carroll and Livingston.
17—50 to 90 feet.....	
18—1½ feet (Warrensburgh coal).....	Johnson, Henry and Charitan.
19—52 feet.....	
20—7 inches coal.....	Johnson.
21—18 feet.....	
22—1 foot 8 inches coal.....	Johnson.
23—18 feet.....	
24—8 inches coal.....	Johnson.
25—4 feet.....	
26—2 feet coal.....	Henry.
27—48 feet.....	
28—2¼ feet to 4 feet 5 inches coal.....	Randolph, Boone, Callaway, Johnson, Henry, Vernon, Bates, Adair, Sullivan, Putnam, Audrain and Macon.
29—11 feet.....	Macon.
30—11 inches coal.....	Macon, Henry and Johnson.
31—About 13 feet.....	
32—2 feet coal; 10 inches of clay near base.....	Ralls, Audrain, St. Louis, St. Charles and Montgomery, Henry and Johnson.

## O H I O .

The coal measures within this State occupy a space of about 180 miles in length by 80 in breadth at the widest part, with an area of about 10,000 square miles, extending along the Ohio river from Trumbull county, on the north, to near the mouth of the Scioto, on the south. The counties wholly underlain with coal are Mahoning, Columbiana, Stark, Holmes, Tuscarawas, Carroll, Jefferson, Harrison, Belmont, Guernsey, Coshocton, Muskingum,

Perry, Noble, Morgan, Monroe, Washington, Athens, Miegs, Galla, Lawrence, and nearly all of Jackson. The counties of which the eastern or southeastern parts only are underlain with coal are Trumbull, Summit, Medina, Wayne, Licking, Fairfield, Hocking, Vinton, and Scioto. There are small detached basins in Wayne, Ashland, Richland, and Knox counties. The boundary on the east is the State line, the same field extending eastward over all western Pennsylvania.

Prof. J. S. Newberry, divides the coals of Ohio into three classes—first, the dry, open-burning or furnace coals; second, cementing or coking coals; third, cannel coals, the first, which is popularly known as block coal, includes those that do not coke and adhere in the furnace, and are such as may be used in the raw state for the manufacture of iron. The second, embracing by far the greater portion, are of the ordinary coking, bituminous kinds, which to a greater or less degree melt and agglutinate by heat. The third variety consists of the cannel coals, which resemble a dark shale, highly impregnated with bitumen, and burns with a bright flame, but does not agglutinate.

The chief mining regions of Ohio are the Mahoning Valley, the Tuscarawas Valley, the Hocking Valley, including the Straitsville and Shawnee mines, the Salineville region, the Pomeroy region, the Bellaire region, the Steubenville region, the Jackson region, the Cambridge region, the Coshoc-ton region, the Leetonia region, and the Ironton region.

The mines of Mahoning Valley, the Tuscarawas Valley, and the Jackson region are all opened on the lower coal of the measures, called Briar Hill coal, Block coal, furnace coal, etc. It is usually about four feet thick. The mines of Hocking region, Steubenville, part of Salineville, Cambridge, are opened on No. 6, which ranges from 4 to 13 feet of thickness and is open burning in quality also. The others are worked in each of the different beds, of which there are ten altogether of minable thickness.

The chemical analysis of the Ohio coals shows that the relative amount of moisture varies from 1.10 per cent. to something over 9.10 per cent. The amount of volatile matter varies from 28 per cent to something over 40 per cent. Fixed carbon varied from 34.10 (in the upper coal from Holmes county) to 65.90 (in the coal from Steubenville shaft.) The ash found in eleven Ohio cannel coals was 12.827 per cent. The average proportion of sulphur was 1.551 per cent, that from the lower half of the State being 1.229 per cent. and that of the coal from the upper half 1.836 per cent.

Coal was discovered in Tallmadge, a mile west of the Centre, as early as 1810. It was visible in a small ravine, where for many years blacksmiths from the adjacent country came and dug it from an open pit. At that time no other coal was known in Northern Ohio. As early as 1755, mineral coal



had been discovered near Bolivar, in Tuscarawas county, by its being seen on fire, but it was not dug or mined for use as fuel, in this part of the State, prior to the year 1810. The seam was four feet thick, and was regularly mined in 1820.

The Perry county coal field is new, dating back only to 1870 ; yet there is more coal annually produced in this county, than in any other in the state. The coal is of the same character as the block coal of Mercer, Trumbull, Mahoning and other adjoining counties, is eleven feet thick ; there are two other veins, one under and one above the "great vein," aggregating another eleven feet making in all twenty-two feet of coal in three veins, in the same hill, all above the water level.

Regarding the coal resources of the State of Ohio, the Inspector of mines, Andrew Roy, reports that there are sixteen different seams of coal which exceed two feet in thickness. There are several other seams, but they are very thin, not exceeding two to six inches in height, and often of quite limited area. Thirteen or fourteen of the series are of workable thickness in many places of the coal field, but with the exception of No. 6, all the lower workable coals are subject to faults, or become so reduced in height as to be of little or no commercial value over large areas where they are due. Even No. 6, which, in many places in Perry, Jefferson, and Tuscarawas counties, rises to the magnificent height of eight or ten feet, dwarfs to two and one-half feet, then down to a mere trace, and sometimes disappears altogether. No. 8, the Pittsburgh seam, is remarkable alike for its continuity wherever it is due, and for its presence in workable height.

"Though there are numerous wants in the different coal beds of the State, there is a general continuity of the seams from outcrop to outcrop. The coals of the Mahoning valley and Massillon regions have their representatives in the Jackson and Lawrence districts. It is suggested that the wants or interruptions are the result of water spaces existing in the old coal plain at the time of the deposition of the coal vegetation, and also of denuding forces and the rolling or hilly character of the coal marsh. Where wants are met in any of the seams having level floors, the coal has been eroded by currents of water in rapid motion passing over the loosely matted peaty material, and cutting or washing channels through part or the whole thickness of the peat bog during the first stages of the subsidence of the coal. Sandstones, fire-clays, or shales, usually the former, are found usurping the place of the eroded coal where wants are found in any of the seams due to erosive agencies or to original water spaces. The floor of the coal beds is almost invariably wavy and rolling, the high arches or hills containing

barren ground. The coal is seen to become gradually thinner in ascending these hills, and finally to disappear altogether. This wavy character of the coal floors is more marked in the lower than in the upper coals of the series, and is most marked of all in the lowest seam, or Coal No. 1.

"The strata associated with the different beds of coal are composed of sheets of shales, sandstones, limestones, iron ores, and fire clays in alternating layers. None of these sheets, except the fire-clays forming the floor of the coal beds, are persistent like the coals, but appear and disappear at frequent intervals. The shales are replaced by sandstones, the sandstones by shales, the limestones change to pure or calcareous shale or sandstone, and the iron ores also become changed to other rocks. The first deposition of sedimentary material which formed over the coal after the subsidence of the coal marsh, was very generally mud (now shale), though sandstone, impregnated with the remains of the coal flora, showing that this was the first formation, is sometimes found forming the coal roof. Frequently a sandstone is met, but shale was the first deposition, and was subsequently removed. None of the sheets forming the coal strata are very thick. Masses of material, either sandstone or shale, several hundred feet in thickness, are met, but on close examination they are found to change in color and character, the alternating shales being black, blue, gray, etc., and the sandstones being light, red, buff, gray, etc.

The coal produced in 1872, was 5,315,294 tons; in 1873, 5,450,028 tons; in 1874, 3,267,585 tons; in 1875, 4,868,259 tons; and for 1876, Mr. Roy estimates the output at 3,500,000 tons.

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## TENNESSEE.

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This is included in the great Appalachian coal-field of the United States, which extends from Pennsylvania to Alabama, and comprises 80,000 square miles, 60,000 of which will furnish available coal. Its area in Tennessee is 5,100 square miles, which area includes the whole of the Cumberland Table-land. This division of the State forms an irregular quadrilateral, having the northern and southern boundaries nearly parallel, the former being about 71 miles long, and the latter or southern boundary being about 50 miles in length. The other sides run diagonally through the State in a northeasterly and southwesterly direction. A central longitudinal line would bear about north 20° east.

Between the Mountain limestone and the top of the main conglomerate which forms the general surface of the Table-land, there is a series of strata composed of shales, sandstones, fire-clay and coal. The average thickness of this series, including the conglomerate rock, is about four hundred feet,

thinning out in some of the counties to two hundred feet or less. This series constitutes the Lower coal measures. There are three well defined seams of coal found in what is known as the Lower coal measures :

1. *The Slate Vein*.—This occurs from twenty to sixty feet above the Mountain limestone, and is called the *Slate Vein*, because overlying it is a bed of shale from fifteen to twenty feet thick. A rusty-colored shale often appears beneath. The coal in this seam is from one to three feet thick, and is very hard and lustrous.

2. *The Cliff Vein*.—This lies sixty to eighty feet above the Slate Vein, and is capped by a heavy sandstone, which forms a well defined cliff above the coal. This seam is from one to twelve feet thick ; coal hard and much like that of the Slate Vein.

3. *The Sub-conglomerate Vein*.—This is too thin to work at the outcrop, and is important only in showing its wonderful persistency. It is from six inches to two feet thick, affording excellent coal.

These three seams are the only beds of coal that are known to exist in the Lower coal measures. One other has been suspected, but there are reasons for believing that it is a drop from the Cliff Vein.

Superimposed upon the main or table-covering conglomerate are many billowy ridges composed of sandstone and shales, with several coal seams. In the region around Tracy City there are usually four of these seams, only one of which, the main Sewanee, may be considered valuable. At Coal Creek, in Anderson County, where the Upper coal measures reach a much greater thickness, the number of seams is greatly increased. According to Prof. Bradley, there are twenty-one seams at Coal Creek, eight of which are workable. The Seams in the Upper coal measures appear to be more uniform in thickness, but the coal usually has not the hardness, nor will it bear transportation so well as that of the Lower Measures. The principal seams are found in about the following order.

1. Twenty feet above the main conglomerate which divides the Upper from the Lower coal measures, the first seam is met with, which is usually from one to two feet thick, sometimes swelling out to a thickness of four feet, with thirty feet of shale above separating it from.

2. *The Main Sewanee*.—This varies in thickness, from two to seven feet, usually about four feet, and is capped by a bed of shale from fifteen to twenty feet thick. Sometimes the sandstone lies immediately above the coal. The quality of this coal is well known, on account of its having been mined more extensively than any other in the State. It is a very pure coal, bituminous, spumous, fragile with contorted laminæ; highly esteemed as a heat generator, being what is called a long-flamed coal. It makes ex-



cellent coke, which is used extensively in the manufacture of pig iron, and in rolling mills. The greatest and almost the only objection to the coal of this seam is its tendency to slack or to disintegrate upon exposure to the atmosphere. At a few of the outcrops of this seam, however, the coal is cubical and of great specific gravity, preserving the purity of the upper seams and the hardness of the lower. Such coal is found at Deakin's bank, in Sequatchee county, and at Kelly's bank, in Marion.

3d. and 4th. Two thin seams of coal 160 and 200 feet above the Main Sewanee. These seams are almost useless, the thickest showing only one foot of good coal.

To summarize: The coal-field is separated by the main conglomerate into the Upper and Lower coal measures. The Lower measures have three seams of coal, two of which are workable. The Upper Measures in the northeastern part of the coal-field have eight workable seams, and in the southern part only one, which is the Main Sewanee.

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## ARKANSAS.

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The coal field of Arkansas has an area of 12,000 square miles, in twelve counties. The coal found is semi-bituminous or semi-anthracite. A bed of semi-bituminous coal nine feet thick is reported in Sebastian County. The Spadra semi-anthracite is the only coal that is known in market to any extent, and an account of its location, etc., will prove interesting. "This name is given to a deposit of semi-anthracite coal, three feet thick, found at Spadra, in Johnson County, 105 miles from Little Rock, now being worked by the Spadra Coal and Iron Company. It lies almost horizontal, with a slight dip to the north. It crops out on the river bank, and is traceable along the river front. On digging anywhere, the same vein, from  $3\frac{1}{2}$  to 4 feet thick, is invariably struck within 55 feet of the level of the river front. The product is about 5,000 tons. The existence of a second vein, which is, as near as can be ascertained, about 30 feet below the one now working, is a matter of development. The coal can be placed at Little Rock at \$3.25 a ton; at the mouth of the Arkansas River, \$3.75 a ton; at New Orleans for \$5 a ton; at St. Louis, \$6.75 per ton."

The only coal to compete with on the lower Mississippi, from the mouth of the Arkansas to New Orleans, 600 miles—which section of country consumes about one million of tons per annum—is the Bituminous coal, principally furnished by Pittsburgh.

The mines of the Ouita Coal Co., producing an excellent variety of this semi-anthracite, are seventy-two miles from Little Rock; the vein is 32

inches thick. Analysis gave 80.46 fixed carbon; 12.66 volatile matter; ash, 5.11; water, 1.77; color of ash, light brown.

Professor Owen gives an analysis of the coal in the First Geological Report on Arkansas, page 130. It was also analysed by Mr. I. A. Liebig, and by L. C. Bierwirth, with the following results:

	OWEN.	LIEBIG.	BIERWIRTH.
Moisture.....	0.5	1,524	0.680
Volatile and combustible gases.....	7.9	7,527	10.221
Fixed Carbon.....	85.6	85,081	83,719
Ashes.....	6.0	5,468	5,080
Total.....	100.	100.	100.
Specific gravity.....	1.335	1.3408	1.3112

## IOWA.

The coal industry of this State has made great progress during the last few years, especially in the county of Polk, which is situated centrally as regards the field. For the most part the demand and market has been purely local, but for the last two years an export trade of some value has sprung up and is still on the increase; northward into Minnesota and Wisconsin, southward into Kansas, and westward into Nebraska, etc., The chief customers are the various railroads which in such number traverse the State, and then again derive a considerable portion of their local freight from the coal industry.

In the year 1874 the last general Census of the State was taken, and the assessors were all supplied with printed forms of interrogatories, intended to elicit complete information regarding this important industry; but the result was not entirely satisfactory, as some coal companies appeared unwilling to give full data regarding their works, mines, development thereof, output, ruling prices, etc. However a close approximation was obtained, and from it we find that in the year '74, there was 372 "banks" or mines opened, and being worked, employing 2928 hands of all grades in their development, with a total output for the year of 1,231,547 tons, of an estimated value of \$2,600,140. Since that time, during the last two years, several new mines have been opened, and the number now being worked is probably over 400. Coal has also been discovered in other counties than those worked in '74, so that it is now found and worked in 26 out of the total of 100 counties in the State.

The yield for a series of years past (those in which Censuses were taken) has been as follows:

1862.....	36,074 tons.	1866.....	99,320 tons.
1864.....	66,663 tons.	1868.....	241,453 tons.
1874.....			1,231,547 tons.

And for the year 1876 at the same rate of increase as from 1868 to 1874, the output would not be less than 1,561,580 tons, which is probably under the mark

The whole coal field is well intersected by railroads, giving access to every important point therein, and the Des Moines river bisects it longitudinally into two very nearly equal parts.

In the years '66, '67, '68, and '69, a Geological Survey of the State was made under the direction of Dr. Chas. A. White, State Geologist. The Survey though not exhaustive, gave very valuable results, and we hope it will soon be resumed to include all those portions of the State yet unexamined. The various geological series are all developed very uniformly, the common longitudinal axis or direction of *strike* being from N. W. to S. E., in fact in the same direction as the Des Moines, and Cedar rivers and others.

Commencing with the oldest geological series represented in the State, the Azoic, we find a very curious outcrop of Sioux Quartzite, occupying an area of some 20 sq. miles in the extreme northwestern corner of the State in Lyon's County. Following down the Big Sioux river, about 35 miles below the former, the cretaceous series appears and continues along that river with an average width of some 12 or 14 miles, to a point on the Missouri river, about 18 miles below the entrance of the Big Sioux. This series does not occur again in Iowa, except in small isolated tracts some ten in number, in counties of Cass, Montgomery, and Carroll, Greene and Guthrie, and its total area in the State amounts to some 850 sq. miles. Following down the Missouri, we meet the outcrop of the upper coal measures, in the southwest corner of Monona County, at a point about fifteen miles above the entrance of the Little Sioux river. These measures cover a triangular area in the southwest portion of the State, of about 9,400 square miles, bounded on the west by the Missouri river, south by the Missouri State line, and north by a line somewhat irregular, but running approximately in a S. E. direction, intersecting the southern boundary of the State, at a point in Appanoose County about eight miles west of the Chariton river.

In the Upper coal measures, comparatively few developments have been made. They comprised in 1874, in Adams County, 9 banks open, employing 21 hands, with a production for that year of 3,000 tons, valued at \$11,250. In Taylor County, lying immediately south of Adams, the number of banks open was 3, of hands employed 22, production, 1,160 tons, of a value of \$4,320. In Wayne County there were 9 banks open, employing 49 hands, producing 4,034 tons, of \$9,068 in value. These comprise almost all the mines working the upper coal measures in the year 1874, with the exception perhaps of a few in Lucas and Appanoose Counties,



which are both crossed by the division between the upper and middle coal measures, but the mines in which most probably belong to the next or middle coal measures. The middle and the lower coal measures constitute the next geological series or division to the east of the last described, and their most western outcrop is in Audubon County, at a point about 40 miles west of Exira. Thence the edge of outcrop runs in a direction (approximating N. by E. to the northwest corner of Webster County, thence east by south to a point a few miles east of Eldora in Hardin County, thence south to the centre of the south line of Marshall County, thence in a southeasterly direction parallel to the Des Moines river, to the north-east corner of Jefferson County, thence south to the south line of the state; this area comprising about 10,800 sq. miles the whole or parts of 26 counties, and constituting the true coal field of Iowa. The number of tons mined in 1874 in these measures was 1,223, 453, of a value of \$2,575,502; were from 351 mines or banks, employing a force of 2,836 hands.

North and east of the lower coal measures is the area covered by the sub carboniferous rocks and clays, with a frontage on the Mississippi of nearly 100 miles, and a total average of about 7,200 sq. miles. Next comes the Devonian area of about 8,860 sq. miles fronting for about 25 miles on the Mississippi. Next the much smaller area of the Upper Silurian, series, 4,320 sq. miles, followed by the Lower Silurian, occupying some 2,230 sq. miles in the north-east corner of the state, and a long narrow strip along the Mississippi giving a frontage of over 160 miles. The surface of Iowa may be subdivided geologically then as follows :

Cretaceous.....	850 square miles.
Upper coal measures.....	9,400      “
Middle and lower coal measures.....	10,000      “
Subcarboniferous.....	7,200      “
Devonian.....	8,860      “
Upper Silurian.....	4,320      “
Lower Silurian.....	2,230      “
Azoic.....	20      “
Undetermined as yet.....	11,365      “
<hr/>	
Total area of Iowa.....	55,045      “

## ALABAMA.

There are two distinct coal formations in Alabama, the Coosa being a continuation of the Cahaba; originally the Warrior and Cahaba were one and the same, but became separated by the Silurian strata being thrown up between them, and they now form two fields.

On the Selma, Rome and Dalton Railroad, at a point fifty-five miles from Selma, a branch railroad, runs to the openings on a coal seam, which averages from two feet six inches to four feet in thickness, it is very hard, Semi-bituminous, red ash, free burning, non-coking, and a good household fuel. Being above water level, no machinery for either hoisting or pumping is required.

The principal market for these coals is the city of Selma, for household use, high freights on the railroad preventing its reaching distant points. The true destination for this coal would be one of the Gulf ports, say Pensacola, distant from Montevallo 270 miles, to be sold as a steam coal for marine purposes; and when Southern railroads learn that it is to their interest to have cheap coal freights, it will be carried there.

At Celera, seven miles northeast of Montevallo, the Selma, Rome and Dalton Railroad is crossed by the South and North Railroad, a continuation of the Louisville and Nashville Railroad to Montgomery. On this road, seventeen miles north of Celera, the Cahaba coal field is again reached at Helena Station. Several companies are working the seam which is here, from two and a half to three feet; a good coking coal, mainly above water level.

Crossing the Cahaba River, we find we have passed over the coal basin, and the coal dips south. The coal is a coking coal of fair quality, not very free-burning, and averages from two feet six inches to three feet thick. The next seam that is opened is five feet in thickness, also above water level, and a most excellent coal for blacksmiths's use and for making coke, but is far too friable for either steamer or household use. This coal averages from four to five feet in thickness.

In the Warrior field developments have been made sufficient to show six workable seams of coal, many of which are coking, varying from two and a half feet to seven feet in thickness. The dip is slight compared with that of Cahaba, although the quality is not quite equal to some of the seams in the latter formation, most of the Warrior containing small bands of shale. One of the upper series has been struck, showing eight feet of coal, free from slate and a good coking coal.

Both the Cahaba and Warrior fields are crossed by the extension of the Louisville road from Nashville south to Montgomery and Mobile, and when the Cincinnati Southern, now in course of construction, shall be completed, the outlets for the new industry that has sprung up in this part of the south since the war, will be all that can be desired. At the point where the railroad intersects the Cahaba in its course through the valley formed by the synclinal position of the strata on either side, from fifteen to twenty

workable seams of coal are exposed, aggregating a total thickness of not less than sixty feet. This field is twelve miles broad from north to south, by forty miles in length, aggregating five hundred square miles. The Warrior coal field, which is the largest of the two, stretches nearly across the state, and extends north from Birmingham nearly to the Tennessee river. This field covers an area of over five thousand square miles. The beds escaped the greatest force of the upheaval that brought them to the surface, and are consequently much less inclined than those of the Cahaba, which lie at an angle, usually of about thirty-five degrees, while the former seldom reaches twenty.

Component Parts by Analysis.	Cahaba Level Bed.	Cahaba Mulberry Creek.	Cahaba. Southern End.	Warrior. Southern End.
Volatile matter.....	35.51	36.68	34.49	40.60
Fixed Carbon.....	57.42	57.23	60.09	54.07
Ashes.....	6.31	5.30	4.32	3.09
Moisture.....	.76	.79	.93	1.18
Sulphur.....	Trace	Trace	.17	1.06

## ILLINOIS.

The valuable features of the coal found in this State are, that there is plenty of it, that it is very widely distributed over the State, and readily accessible. Although it is generally necessary to mine it by means of shafts, the coal is reached at so reasonable a depth from the surface that its mining is done without unusual expense; the number of railroads traversing all parts of the State with good level grades and without curves, furnish an abundance of cheap transportation, and there is a large market for the coal that is produced.

The valuable iron-smelting Big Muddy coal, found in the southern part of the State, and extensively used at St. Louis, as well as some of a fair quality in other localities, would lead us to the hope of yet finding coal of a better quality than much of that which is now mined. See the details of trade at St. Louis, for the tonnage of this coal received there.

The United States census of 1870 reports the production of coal in Illinois at 2,629,563 tons. To those accustomed to the large production of Eastern mines near our seaboard, these figures may appear small, but it should be considered that the coal business in the West is yet in its infancy. In La Salle Connty there are three seams of coal, the upper four and a half to five feet thick, the middle usually six feet, and the lower four feet. The most popular in the market is the middle, as it makes a dense fire, and is largely used for steam and domestic uses. In 1870 the product was 173,864



tons, according to the census reports, and this has probably been doubled by this time. What is known as Wilmington coal is found in Will and Livingston Counties; this is the cheap steam coal of Chicago, it is mined at and near Braidwood, some 53 miles south of Chicago, on the Chicago and Alton railroad, the seam averaging three feet in thickness. The amount in 1875 was 512,800 tons, and 510,533 tons in 1876. It makes a good steam coal, and is much liked for locomotive use. We append details of the business of the principal companies:—

Company.	Tons mined 1875.	Tons mined 1876.	Men Employed.
Wilmington and Vermillion Co.....	225,879	242,445	805
Eureka Coal Co.....	131,615	125,000	410
Wilmington Star Mining Co.....	117,680	79,630	265
Wilmington Coal Mining & Mt. Co....	37,626	51,458	120
Braidwood Coal Co.....	— —	12,000	65
Totals .....	512,800	510,533	1,665

St. Louis, Missouri, obtains a large supply of Bituminous coal from the Belleville district, in St. Clair County, Illinois. This county contains 450 square miles of coal, and the last census returns show a production in this county of 793,810 tons. The principal seam worked is from five to seven feet in thickness, and is economically mined. Analysis of this coal shows: Water, 6; volatile matter, 33.8; fixed carbon, 55.2; ash, 5.

In Vermillion County the seam is six feet thick, furnishing a good fat, soft caking coal. The vein is from seventy to one hundred feet below the surface. Mining was begun in 1867. The annual product is 250,000 tons.

In Williamson County, has been found a seam of nine feet in thickness which does not appear in the reports of the Geological Survey of this State; it is being made into coke for use at the furnaces at Grand Tower; analysis of the coke, showed fixed carbon, 85.79; volatile matter, 2.42; moisture, 2.48; and ash, 8.31.

## KENTUCKY.

This State is mineralogically endowed with two distinct coal fields. The coal of Illinois enters the State near Hawesville, and occupies nearly the whole of twelve counties in the the northwestern portion of the State. The Appalachian coal crosses the Ohio river, a little above Portsmouth, and fills up nearly the whole of the eastern twenty counties.

The Kentucky river has its headwaters altogether among the coal bearing rocks. A section made from Red river in Wolfe county to the mouth of Troublesome creek in Breathitt county establishes the fact that five good

veins of coal exist. The indications are that the coal measures thicken, and the number of workable coals increase south-easterly from the mouth of Troublesome Creek. Cannel coal of excellent quality is found over an extended area of country bordering upon the stream and its tributaries. In addition to the numerous workable coals above the conglomerate sandstone in this region, there are two seams below, that are of workable thickness and of good quality.

Prof. D. D. Owen, before his demise, made a mineralogical and geological survey of the State, but the work was not completed. A large portion of the eastern coal-field was unfinished. Since the suspension of the survey new discoveries have been made—new coals opened and brought into market. Approaching the southeastern counties, by the Cumberland Gap branch of the Louisville and Nashville Railroad in the county of Rock Castle, we first encounter the sub-carboniferous limestone, which is the floor of the coal measures of the State. The limestone series are here three hundred and fifty feet thick, composed of an underlying sandstone; some few feet of colored shales, white marble beds, cherty beds, and encrinal limestone. Upon this member of the group reposes the coal conglomerate, frequently eighty and ninety feet thick. Ten miles from Mount Vernon, the country-seat of Rock Castle County, the coal measures of the three hills where the coal is opened rests immediately upon the limestone without the intervention of the conglomerate. There are two veins of coals in the hills. The lower one, at an elevation of fifty feet above the railroad, is too impure to be of any commercial value. The upper coal, about fifty feet beneath the summit of the hills, is being worked to advantage. The upper coal is three feet thick, and has the usual appearance of a good, dry-burning bituminous coal.

The coal field west of the Louisville and Nashville Railroad was first developed during the year 1872. In form this coal field is somewhat basin like; that is, the beds incline from the margin towards the centre. It underlies either in whole, or in part the counties of Christian, Butler, Hopkins, Muhlenburg, Hart, Grayson, McLean, Webster, Union, Henderson, Davies, Ohio, Hancock and Breckenridge, or a total area of nearly four thousand square miles for this coal field. Twelve beds of coal have been identified in the measures, but the results of the survey point to eight as the number of beds that will prove sufficiently trustworthy to receive final numbers. The markets for the coal are Nashville Tenn., and points on line of railroad from Evansville, Ind., to Nashville, Tenn. There are twelve veins of coal, ranging from two feet to eight feet in thickness. For steam purposes the coal rates at 99, Pittsburgh coal being a hundred. For gas

purposes four feet to the pound is obtained, but there is more sulphur than in Pittsburgh coal.

We append an analysis of the celebrated Breckenridge cannel coal ; volatile matter, 54.40 ; fixed carbon, 32.00 ; ash, 12.30 ; moisture, 1.30.

It is an error to suppose that the coal of Kentucky contains a greater percentage of sulphur than the coals of neighboring regions. In Indiana and Illinois certain coal beds have won a higher reputation than has hitherto been accorded the Kentucky coals, but later investigations have developed the fact that here, too, are exceptionally good beds, unexcelled, perhaps, by the most famous of those States. They have hitherto escaped general notice from the fact that they do not lie in what has been the district of active mining operations, although within convenient reach of transportation facilities. The following shows the total production of coal in the Western Kentucky coal field, for 1876.

Mines on St. Louis and Southeastern Railroad.....	113,000 tons.
Mines on Paducah and Elizabethtown R. R.....	146,000 tons.
Mines on Green River.....	60,000 tons.
Mines on Ohio River.....	96,000 tons.

Making the grand total of.....415,000 tons.

The Louisville and Nashville road carried 40,000 tons out of the Eastern coal field. There is also a large amount sent out from this portion of the coalfield, via the Cumberland River, Kentucky River, and from Boyd and Lawrence counties, on the Ohio River ; so that the total amount from the State may be safely estimated at 700,000 tons for the year.



## COAL PRODUCTION OF THE GLOBE, 1870 TO 1875.

*Prepared for this Work by James Macfarlane, Author of "The Coal Regions of America."*

	Square miles of	1870.	1871.	1872.	1873.	1874.	1875.
Great Britain.....	11,900	110,431,192	117,352,028	123,497,316	127,016,747	125,067,916	133,304,485
United States.....	192,000	32,863,690	41,000,000	45,000,000	50,512,000	47,872,963	49,694,652
Germany.....	1,770	23,316,238	37,852,463	42,324,466	40,335,741	41,655,332	42,283,097
France.....	2,086	6,550,000	13,400,000	15,899,005	17,500,000	17,059,547	16,949,031
Belgium.....	510	13,697,118	13,733,176	15,158,948	15,778,401	14,669,029	15,011,311
Austria.....	1,800	6,443,575	9,891,350	10,389,952	10,500,000	11,000,000	10,895,000
Russia.....	30,000	817,008	829,722	1,097,832	1,123,940	1,343,558	1,750,000
Spain.....	3,501	414,432	500,000	570,000	589,707	600,000	560,000
Portugal.....	.....	.....	.....	18,000	18,000	18,000	.....
Nova Scotia.....	18,000	625,769	673,242	880,950	1,051,567	872,720	781,165
Australia.. ..	24,840	868,564	915,784	1,040,154	1,226,475	1,304,567	1,450,000
India.....	2,004	500,000	500,000	600,000	850,000	850,000	850,000
Japan.....	5,000	.....	.....	84,000	150,000	390,000	325,500
Vancouver's Island.....	390	29,863	45,000	75,000	75,000	81,397	113,000
*Other Countries.....	.....	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
.....	.....	197,557,499	247,692,764	258,141,623	267,737,179	262,785,029	274,967,241

\* Italy, New Zealand, Chili, China, etc.

## THE GERMAN EMPIRE.

This country, as now consolidated, ranks as the largest producer of coal in Europe.

The production of coal and Brown coal in Prussia for a series of years.

Years.	Tons.	Years.	Tons.
1837.....	1,950,915	1867.....	23,738,327
1857.....	9,841,220	1868.....	25,704,758
1858.....	10,721,323	1869.....	26,774,368
1860.....	12,347,828	1870.....	23,316,238
1861.....	14,138,048	1871.....	32,843,288
1862.....	15,576,278	1872.....	36,973,411
1863.....	16,906,707	1873.....	40,335,741
1864.....	19,408,982	1874.....	40,685,332
1865.....	21,794,705	1875.....	41,759,558
1866.....	21,629,746	1876.....	43,364,968

Since 1870, the Empire includes old Prussia, Saxony, Bavaria, and the States of the Zollverien.

The product of coal of all kinds in the whole of the German States, now amounts to something nearly fifty million tons annually, placing this country well up in the rank of coal producers of the globe. The grand total of the output in 1871, when the consolidation of the empire was completed, was 37,852,464 tons; in 1872, 42,324,466 tons, of 2240 lbs. each; we have no returns from the individual states later than this year, but we may safely put them down for five million tons annually. There is sent out from the Empire some four million tons of coal and coke, while the receipts from surrounding countries are two million tons; the number of square miles of coal area, in the Empire. is set down at one thousand seven hundred and seventy, this for the entire country, as now consolidated.

The great extension given to the metal and textile industries of Westphalia, and the Lower Rhine, is chiefly due to the proximity of coal. The Upper Silesian coal nourishes the extensive productions of iron and zinc carried on in that province. In Lower Silesia and Saxony, the mining industry is but slightly developed and the coal of these districts is almost entirely used in the working of spinning mills and weaving establishments. The Saar coal is partly exported to France for Railway purposes. Westphalia chiefly produces caking coal; the Upper Silesian coal contains a large proportion of hydrogen, and is therefore, principally used for gas. The proportion produced by each district may be stated as follows: Westphalia or Ruhr,  $47\frac{1}{2}$  per cent.; Silesian coal, 30 per cent.; Saxon coal, 11 per cent.; Saar,  $11\frac{1}{2}$  per cent.

## COAL CUTTING BY MACHINERY.

We give a description of the Gillett and Copley machine, as we learn it is the most popular, in Great Britain, where this subject has attracted such a large share of attention. This machine is adapted for any seam of 24 in. and upwards, and can arrange its cutters at any level, as the circumstance of the seam may require, and is self-acting. It is made principally of steel and wrought iron; the frame is of angle iron, about 5 ft. 4 in. long by 2 ft. 4 in. wide, on which are fixed two cylinders  $7\frac{1}{4}$  in. diameter, with a 9-in. stroke, working on to a crank shaft, which by a simple contrivance drives the pinion, which gears into the slots of the cutter wheel. The wheel is of cast steel, 3 ft. 10 in. diameter, and makes six revolutions per minute; on its outer edge are fixed 26 cutters, thus giving 120 strokes per minute, making an under-cut of 3 ft. 4 in. by  $2\frac{1}{2}$  to 3 in thick; the cutters are 4 in. long by  $\frac{3}{4}$  in. square. Its self-acting or propelling arrangements are by a wire rope passing round a snatch-block fixed at one end of the face to be holed, and working round a small drum fixed at the front end of the machine, which is actuated by a ratchet wheel and lever worked by an adjustable crank. The top of the machine is covered by a plate of sheet iron to prevent the roof from falling among the working parts. A fair average work with this machine is reported to be about 25 to 30 yards long by 2 ft. 4 in. wide, with a pressure of air of 27 lbs. In one economic aspect this cutter is doing good service—in producing a large proportion of round coal. Out of every 100 tons of hand-hewed coal, 3 ft. 4 in. thick, 50 tons only of round coal are produced, the remainder being small, while the quantity produced by the cutter gives seventy-five tons of round to 25 tons of small.

## IMPROVEMENTS ON THE KANAWHA.

The government improvements of the navigation of the Kanawha river, by dams and locks, now under way, will tend to develop the resources of this most wonderful region, and it will not be surprising to find this region in a few years the iron making district of America. Ten locks and dams will furnish slack water navigation from the Ohio river, to Cannelton, a distance of 85 miles, the cost of which will be about \$250,000 for each dam with lock. Of these ten, there will be three above and seven below Charleston. These locks and dams are being constructed of hewn stone, and in the most workmanlike manner. In nine of the dams, however, there is to be an 'open pass,' two hundred and fifty feet in length. In this 'open pass,' there is to be a wooden and iron structure, so arranged that it can be elevated in low water, and thereby furnish seven feet of water in the shallowest places, in the river, and can be lowered during high water, and thereby furnish free and unobstructed navigation during the rises in the river. Hence, these dams are called 'movable dams.' The first nine dams from the Ohio river are to be movable dams, which will furnish seven feet of water from Paint creek to the Ohio river during low water, and an open river during high water. The locations and lifts of the dams will be as follows: At or near the mouth of the Kanawha, 8 feet lift, at or near Debby's Ripple, 7 feet lift; at or near Gillespie's Ripple, 6 feet lift; at or near Red House Shoals,  $6\frac{1}{2}$  feet lift; at or near Johnson's Shoals, 7 feet lift; at or near Newcomer's Shoals,  $6\frac{1}{2}$  feet lift; at or near Island Shoals, 7 feet lift; at Brownstown, 7 feet lift; at Cabin Creek, 7 feet lift; at or near Paint Creek, 15 feet lift; total 'lifts' 77 feet, in a distance of 85 miles.



## PETROLEUM PRODUCTION.

*Storrells Petroleum Reporter*, furnishes the following statistics of the Petroleum business for the year 1876:

New wells completed in the year.....	2,290
Daily average product of new wells.....	12½ barrels.
Number of producing wells at the end of December .....	6,000
Daily average production of all wells.....	5 6-10 barrels.
Production for the year, 8,968,906 barrels. Stock on hand at end of year, 2,551,199 barrels. Being a decrease as compared with a year previous, of 999,108 barrels.	

The destination of the product, was as below:

New York.....	24.5 per ct.	Ohio River refiners.....	3.2 per ct.
Cleveland. ....	22.5 per ct.	Consumed by fire.....	2.5 per ct.
Pittsburgh .....	19.1 per ct.	Baltimore.....	2.1 per ct.
Creek Refiners.....	14 per ct.	Boston .....	1.8 per ct.
Philadelphia.....	8.7 per ct.	Local points .....	1.6 per ct.

## COAL IN BRAZIL.

Recent researches prove the existence of coal in some of the provinces of Brazil. The *Candiota* and *Arroio dos Ratos* Mines, in the province of *San Pedro do Rio Grande do Sul*, are considered the most important. The former was granted to an English company, which is about to construct a line of railway for conveying the coal. The latter is also in the hands of an English company, which has its railroad already built, and supplies the steamers on *Lake dos Patos* and on some of the rivers. Concessions have been granted for working other valuable deposits, and it is hoped that in a few years this great element of industry and civilization will help to increase the prosperity of the Empire. Of *Lignites*, there are abundant deposits in most of the provinces, and mining grants have lately been made for working some of them. The *Bituminous Schists* are also not uncommon, but the best known and richest deposits are on the southern coast of the province of *Bahia*. The owners of some of the concessions are working petroleum on a large scale.

## MODES OF WORKING ADOPTED IN THE COAL MINES OF GREAT BRITAIN.

**BANKS AND STRAIT WORK, BORD AND PILLAR, WITH LONGWALL.**—Yorkshire.

**BORD AND PILLAR.**—Northumberland, North Durham, Cumberland, South Durham, North Staffordshire, Cheshire and Shropshire.

**BORD AND PILLAR AND LONGWALL.**—East and West Scotland.

**LONGWALL.**—Derbyshire, Nottinghamshire, Leicestershire, Warwickshire, South Staffordshire,\* Worcestershire.

**SPECIES OF BORD AND PILLAR.**—North, East and West Lancashire, South Wales.

**STRAIT AND STALLS.**—Monmouthshire, Gloucestershire, Somersetshire, Devonshire, South Wales.

\* Special method of working ten yard seam.

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## CHESAPEAKE AND OHIO CANAL.

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The Chesapeake and Ohio Canal is 191 miles in length, extending from Cumberland, Md., to Alexandria, Va.; and 184 miles from the same point to Georgetown, D. C. It is the outlet for large quantities of the celebrated George's Creek Cumberland Coal. The canal was in order for business in the year 1850. West Virginia Gas Coal is also carried to market by this route, received at Cumberland. The boats carry about 110 tons, and take from four to five days to make the trip. Steam has been used on this canal, as a substitute for horse power, with great success.

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## THE SPONTANEOUS COMBUSTION OF COAL.

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The British Royal Commission report on this subject, that spontaneous ignition of coal, when due to the oxidation of the porous and readily oxidizable carbonaceous substances occurring in coal, does not appear to be favored by the presence of water in the coal, or by its access to a cargo; on the contrary, these portions, by becoming wet, would have their pores more proportionately diminished; hence the presence of water must be antagonistic to the oxidizing action of the latter in many instances, though, when iron pyrites is present, it may promote or accelerate spontaneous heating, as already pointed out.

The gases which are confined in a more or less condensed condition, in coal, vary considerably in quantity and composition in different kinds of coal; and they also gradually undergo various changes in composition by exposure, or keeping of the coal.

Their chief inflammable constituent is marsh gas, and it is to the admixture of this gas with a considerable volume of air, that explosions are due in freights or stores. In pits where explosions are liable to occur, the gas escapes either with more or less rapidity and force from fissures ("blowers"), or gradually from the freshly exposed surfaces of coal seams. When coal from such pits is brought to the surface, it continues slowly to evolve inflammable gas for some time afterwards, especially if the coal be in large masses, or stored in compact heaps.

If facility is not afforded for the ready escape, or removal into the open air, of the inflammable gas emitted from the coal, composing a cargo or contained in bunkers, on board ship, the spaces between the masses of coal, or any partially confined space not occupied by the coal, but in close proximity to, or communicating with it, will, in time, become filled with a mixture of gas with the air in those spaces, which, unless the former be present in very small proportions, would explode on the approach of a flame to it, and with a violence depending upon the proportion which the air bears to the inflammable gas which has become diffused through it.

As the application of flame (or of a body raised to a high red heat) is indispensable to the ignition of mixtures of air with the inflammable gas evolved from coal, it is obvious that explosion cannot occur spontaneously from this cause on board ship, but must be brought about by the accidental or incautious approach of a light to localities where the coal is stored, or where the explosive mixture is likely to penetrate.

If coal, from seams which are charged with marsh gas, is placed on board ship shortly after being raised from the pit, there is obviously great liability to the formation of an explosive atmosphere in the hold or bunkers, or spaces communicating with them, and every possible means should in such cases be had recourse to for facilitating the escape of gas from the coal into the open air.

But, as the gas requires a large admixture of air to render it violently explosive, it is obvious that any attempt to ventilate the coal by passing or drawing air into the body of the freight would be most likely to favor the production of a violently explosive mixture of gas and air. The only useful application which can be made of any special means of ventilation with a view to diminish the risk of explosion, would be to pass a current of air over the coal and immediately into the open air, so as to accelerate the escape and removal of the inflammable gas.

Mr. Henry Scott, of Newcastle, England, has proposed the following scheme for the prevention of the combustion of coal cargoes, by which, he has in three different instances, saved his ship. He remarks that long experience and careful observation have shown, that the first heating invariably takes place under, and in the vicinity of the hatches, and under the main hatch the first indication of increasing heat will always be found, as the largest amount of small and dust coal accumulates in that part, and often sparkling with pulverized pyrites. Mr. Scott suggests that the master, before sailing, should provide himself with three or four bars of round  $\frac{5}{8}$  inch or  $\frac{3}{4}$  inch iron, pointed at one end; also, some rough boards, seven or eight inches broad, one and one-fourth inches thick, a few small-sized studdingsail boom spars, and a few pounds of suitable nails, extra to his sea stock. With these and a little energy, he is fully armed against a merciless enemy. The iron rods are easily thrust down into the cargo in any direction, and once or twice a week drawing them out, and feeling them with the hand, he will detect heating, increase of heat, and the whereabouts of the hottest part; and this, he repeats, will invariably be found under the main hatchway, or near the center. He finds the heat increasing to a dangerous point; no time must be lost; have four of his rough spars, as above mentioned, roughly squared, and with these four-corned uprights, and his boards, nail together a square trunk about fifteen or sixteen feet in length, or, according to his depth of hold, three feet in diameter at one end, and four and one-half feet at the other; then cut it in two for handiness, dig down in the hatchway over the hottest part, and insert the large end of the larger section in the hole, knock a few boards off one side, and let a man go inside and dig away the coals from under the cone, and pass them out, while others force it down by slightly ramming the corner uprights; when it gets down about six feet, it will require little forcing, and if the ship is rolling a little, it will creep down itself as fast as the coals are removed from under it, owing to its pyramidal form and the creeping pressure on its sides; when down its whole length, place the upper section on the lower one, and connect them by nailing battens inside, and sink the whole cone wright down to the keelson, sending the coals up in buckets with a whip. Mr. Scott states that he has never been more than eight hours in getting a trunk down in a ship of twenty feet hold. When the crew have cut through the heart of the central nucleus of hot coal, and removed twenty superficial feet from top to bottom, let them then split out with an adze each alternate board all around in the heated locality, leaving the trunk in that part like a cargo, through the openings of which free out the hot, small, and dust coal, sending it up as before for jettison; and, lastly, rig a large windsail, and tie the foot of it round the top of the trunk, and the danger is past. In twenty-four hours he will find all cooled down, and he may go on his way rejoicing.

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### AIR IN MINES.

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It is found that the temperature of the earth increased with the depth of about one degree Fah. for every fifty feet to sixty feet. At the deep coal pit at Dunkinfield, the



temperature was constantly 75° Fah. at a depth of 2151 feet, and at a depth of 17 feet it was only 1° Fah., which gave an increase of 1° Fah. for every 89 feet only. The average degree of temperature of the earth was 1° Fah. for every 55 feet in descent to a depth of 1800 feet, and afterward 1° Fah. for every 44 feet. At 10,000 feet the temperature would be 212° Fah. provided all other circumstances remained the same; at 20 miles, 1760° Fah., and at 50 miles it would be 4600° Fah., heat sufficient to melt any known metal. Thus the deeper the shafts of their coal mines the greater the amount of natural ventilation they would obtain. A current of air travelling at a speed of 10 feet per second gave a pressure of 492 lbs. to the square foot; at 16 feet=989; at 21.34=6.027, and at 200=39.2, as experienced on the surface of the earth. These might be described as first, a breeze; second, a light gale; third, a gale, and fourth a hurricane. Increased velocity of wind meant greater friction or higher water gauge. Air was perfectly elastic; by pressure it could be squeezed into less bulk, and if that pressure were withdrawn it filled the same space as formerly. Heat had the same effect upon it as pressure. A cubic foot of air weighed 523 grains; a cubic foot of water weighed 1000 ounces; a cubic foot of watery vapor weighed only 272 grains. So that the more vapor there was in the air, the lighter it would be. Friction was estimated by the force required to overcome it. Friction of air increased or decreased in the same proportion that the extent of the rubbing surface exposed to the air increased or decreased. A circular airway offered less resistance in proportion to its area than the perimeter of any other figure. Airways should be as large and with as smooth a surface as possible. Splitting the air current was preferable to taking the whole current of air round the workings in one body. Generally speaking, splitting the air increased the quantity of air obtained by a given expenditure of power, but the benefits to be derived from splitting were limited by the area of the shaft.—*F. W. Wardle, Berslem, England.*

## AMERICAN IRON TRADE.

*From statistics of the American Iron and Steel Association.*

	1873.	1874.	1875.
<b>PIG IRON.</b> —Anthracite.....	1,312,754	1,202,144	908,046
Charcoal.....	577,620	576,557	410,990
Bituminous coal and coke.....	977,904	910,712	947,545
<b>RAILS</b> of all kinds.....	890,077	729,413	792,512
Bar, Angle, Rod, Bolt, etc.....	705,964	687,650	668,755
Plate and Sheet.....	169,169	176,888	192,769
Cut Nails and Spikes.....	201,235	245,609	236,343
<b>BESSEMER</b> Steel Rails made.....	129,015	144,944	290,863
Steel, other than Bessemer.....	52,000	49,681	61,058
Stock of pig iron in first hands at end of year.....	.....	795,784	760,908

## COAL TRADE OF THE UNION.

We give below the tonnage for the year 1869, as per census reports made in 1870, together with figures for year 1876, where available, in other cases we have made a careful estimate based upon our reports of the trade in the various States—we have added 3,000,000 tons to the Anthracite of Pennsylvania, as for local consumption and unreported business.

	1869—tons.	1876—tons.
Pennsylvania—Anthracite.....	15,610,275	21,436,667
—Bituminous.....	7,798,517	11,500,000
Illinois.....	2,629,563	3,500,000
Ohio.....	2,527,285	3,500,000
Maryland.....	1,819,824	1,835,081
Missouri.....	621,930	900,000
West Virginia.....	608,878	800,000
Indiana.....	437,870	950,000
Iowa.....	263,487	1,500,000
Kentucky.....	150,582	650,000
Tennessee.....	133,418	550,000
Virginia.....	61,803	90,000
Kansas.....	32,938	125,000
Oregon.....	.....	200,000
Michigan.....	21,150	30,000
California.....	.....	600,000
Rhode Island.....	14,000	14,000
Alabama.....	11,000	100,000
Nebraska.....	1,425	30,000
Wyoming.....	50,000	500,000
Washington.....	17,844	100,000
Utah.....	5,800	45,000
Colorado.....	4,500	250,000
Total.....	32,860,690	49,005,748

## COAL FIELDS OF THE UNITED STATES OF AMERICA.

New England basin.....	500 square miles.
Pennsylvania Anthracite.....	472 square miles.
Appalachian basin—Pennsylvania section.....	12,302 square miles.
Maryland section.....	550 square miles.
West Virginia section.....	16,000 square miles.
Ohio section.....	10,000 square miles.
East Kentucky section.....	8,983 square miles.
Tennessee.....	5,100 square miles.
Alabama.....	5,330 square miles.
Michigan basin.....	6,700 square miles.
Illinois basin—Illinois section.....	36,800 square miles.
Indiana section.....	6,450 square miles.
West Kentucky section.....	3,888 square miles.
Missouri basin.....	26,887 square miles.
Texas basin.....	4,500 square miles.
Iowa.....	18,000 square miles.
Nebraska.....	3,000 square miles.
Kansas.....	17,000 square miles.
Arkansas.....	9,043 square miles.
Virginia.....	185 square miles.
North Carolina.....	310 square miles.

The total area is 192,000 square miles. The whole production of coal, according to the census reports for 1869–70, was 32,860,690 tons.

## THE RAILWAYS OF THE WORLD.

The figures given below are to the end of 1875, with the exception of the United States, which is for one year later.

EUROPE.		MILES.	SOUTH AMERICA.		MILES.
Germany.....		17,372	Venezuela.....		8
Austria.....		10,792	British Guiana.....		60
Great Britain.....		16,699	Brazil.....		831
France.....		13,414	Argentine Republic.....		987
Belgium.....		2,167	Uruguay.....		190
Holland.....		1,011	Paraguay.....		45
Luxembourg.....		166	Chili.....		618
Switzerland.....		1,293	Peru.....		962
Italy.....		4,777	Total.....		3,701
Spain.....		3,602			
Portugal.....		641	AFRICA.		MILES.
Denmark.....		783	Egypt.....		950
Sweden.....		2,465	Algiers.....		333
Norway.....		310	Tunis.....		37
Russia in Europe.....		11,525	Cape Colony.....		65
Turkey in Europe.....		955	Mauritius.....		66
Roumania.....		766	Total.....		1,451
Greece.....		7			
Total.....		88,745	AUSTRALASIA.		MILES.
ASIA.		MILES.	Victoria.....		563
Russia in Asia.....		623	New South Wales.....		405
Asia Minor.....		249	Queensland.....		263
Hindoostan.....		6,489	South Australia.....		196
Ceylon.....		82	West Australia.....		40
Java.....		162	Tasmania.....		45
Japan.....		38	New Zealand.....		238
Total.....		7,643	Tahiti.....		2
NORTH AMERICA.		MILES.	Total.....		1,752
Canada.....		4,484	CENTRAL AMERICA AND WEST INDIES.		
United States.....		66,640	Honduras.....		56
Mexico.....		377	Costa Rica.....		29
Total.....		81,501	Cuba.....		400
			Jamaica.....		27
			Colombia (Panama Railroad).....		47
			Total.....		559

The table was originally prepared by Dr. G. Stuermer, of Bromberg, Prussia; the figures for the United States for 1876, are from the "Railroad Gazette."



# THE COAL TRADE.

A COMPENDIUM OF VALUABLE INFORMATION

RELATIVE TO

Coal Production, Prices, Transportation, Etc.,

**At Home and Abroad,**

WITH MANY FACTS WORTHY OF PRESERVATION FOR  
FUTURE REFERENCE.

**Corrected to the Latest Dates.**

—BY—

**FREDERICK E. SAWARD,**

Editor of the "COAL TRADE JOURNAL."

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# The Coal Trade.

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## INTRODUCTION.

We present to the consideration of the public, our fifth Annual Review of the Coal Trade, at home and abroad. There is cause for congratulation in the fact that the United States of America, in the matter of coal production, is credited with an amount far ahead of previous years. Second in the amount produced in the entire world, this country still maintains its onward course. Great Britain's output continues to aggregate most remarkable proportions, when the enormous figures already arrived at, and the economies established in the manipulation of iron, are taken into consideration. The State of Pennsylvania never had so large an increase in all varieties. The coal trade of Ohio shows a large increase over previous reports. West Virginia, Indiana, Kentucky, Tennessee, Alabama, Kansas, Colorado, Wyoming and Washington, figure in our reports with increased outputs. The details of the business done, appear under the appropriate heads. Nova Scotia, during last year, took a step forward, and is in a fair way of regaining its position among the coal-producing countries of the globe.

The facts and figures herewith presented, are compiled and tabulated from original and official sources, and the tonnages are to the latest dates attainable—thanks to the courtesies of the friends who have placed us under obligations therefor. The cordial reception awarded the previous editions, warrants the publication of the matter submitted.

## ANTHRACITE COAL.

Anthracite coal is found in an area of about 470 square miles, in Luzerne, Carbon, Schuylkill, Northumberland, Dauphin, and Columbia counties, in the State of Pennsylvania.

We append the following schedule of the production, prepared by Prof. P. W. Sheaffer, showing the amount of all the Anthracite coal marketed since the beginning of the industry in 1820, up to 1871.

1820.....	365 tons.
From 1820 to 1830.....	533,194 tons.
From 1830 to 1840.....	5,940,270 tons.
From 1840 to 1850.....	21,893,153 tons.
From 1850 to 1860.....	63,981,807 tons.
From 1860 to 1870.....	114,319,161 tons.
Total from 1820 to 1870 (50 years).....	206,666,325 tons.

From a table prepared by the late Mr. B. Bunnan, for the same period, we reproduce the following interesting details:

SCHUYLKILL—Forwarded by Railroad.....	57,494,328 tons.
Forwarded by Canal.....	27,673,744 tons.
LEHIGH—Forwarded by Canal.....	25,490,037 tons.
Lehigh Valley Railroad.....	20,062,168 tons.
L. and S. Railroad.....	3,709,931 tons.
WYOMING—Lehigh Valley Railroad.....	5,914,006 tons.
Delaware and Hudson Canal Co.....	20,825,975 tons.
Pennsylvania Coal Co.....	13,164,550 tons.
Pennsylvania Canal.....	10,624,243 tons.
D. L. and W. Railroad.....	18,320,590 tons.
Lackawanna and Bloomsburg road.....	8,773,233 tons.
Lykens Valley and Short Mountain .....	2,677,398 tons.
Northumberland County (Shamokin) .....	6,758,588 tons.
Trevorton .....	1,017,196 tons.

There are three great divisions—which are named from their locations—the first or Southern, the second or Middle, and the third or Northern coal fields.

The Southern coal field lies principally in Schuylkill county, and hence it is often called the Schuylkill region.

The Mahanoy (often included in the Schuylkill) and Lehigh regions constitute the Middle coal field.

The Northern coal field is in Luzerne county, and embraces what is known as the Wyoming, Lackawanna, Scranton, and Wilkesbarre regions.

In addition to the production reported in our statistics, it is estimated that some 3,000,000 tons are annually consumed in the coal regions, by the engines, workmen, and local enterprises, the returns for which are not furnished.



## THE DELAWARE, LACKAWANNA AND WESTERN R. R. CO.

The coal business of this company, which began in 1854, has been as below:—

Year.	Tons.	Year.	Tons.
1854.....	133,965	1866.....	1,519,538
1855.....	187,000	1867.....	1,719,321
1856.....	305,530	1868.....	1,728,785
1857.....	490,023	1869.....	1,563,928
1858.....	683,411	1870.....	2,348,097
1859.....	829,485	1871.....	1,916,486
1860.....	1,080,227	1872.....	2,836,948
1861.....	1,104,319	1873.....	3,136,306
1862.....	1,094,315	1874.....	2,570,437
1863.....	1,223,165	1875.....	3,326,901
1864.....	1,302,457	1876.....	2,300,500
1865.....	1,007,074	1877.....	2,320,636

Tons are stated at 2,000 lbs. per ton.

## PENNSYLVANIA COAL CO.

The tonnage produced by this company, since 1850, has been as below:—

Year.	Tons.	Year.	Tons.
1850.....	111,014	1864.....	759,544
1851.....	316,017	1865.....	577,494
1852.....	426,164	1866.....	535,385
1853.....	512,659	1867.....	861,730
1854.....	496,648	1868.....	953,855
1855.....	504,803	1869.....	966,637
1856.....	612,500	1870.....	1,086,008
1857.....	536,008	1871.....	802,039
1858.....	630,056	1872.....	1,213,478
1859.....	688,854	1873.....	1,239,214
1860.....	701,523	1874.....	1,338,663
1861.....	629,657	1875.....	1,368,207
1862.....	601,091	1876.....	1,086,475
1863.....	662,904	1877.....	1,064,583

Tons are stated at 2,240 lbs.

## DELAWARE AND HUDSON CANAL CO.

This company began mining and carrying coal in 1829. The following table shows the tonnage since the commencement:—

Years.	Tons.	Years.	Tons.
1829.....	7,000	1871.....	1,366,471
1830 to 1839.....	846,330	1872.....	2,930,761
1840 to 1849.....	2,897,881	1873.....	2,752,595
1850 to 1859.....	4,838,855	1874.....	2,399,417
1860 to 1869.....	10,098,661	1875.....	3,053,817
1870.....	2,039,722	1876.....	1,997,545
		1877.....	1,929,248

Tons are stated at 2,240 lbs.

## LEHIGH COAL AND NAVIGATION CO.

Table showing the coal production and shipments of the company:—

Year.	Tons.	Year.	Tons.
1820.....	365	1847.....	351,645
1821.....	1,073	1848.....	360,619
1822.....	2,440	1849.....	393,807
1823.....	5,823	1850.....	424,258
1824.....	9,541	1851.....	460,824
1825.....	28,393	1852.....	510,406
1826.....	31,280	1853.....	496,905
1827.....	27,770	1854.....	544,811
1828.....	33,150	1855.....	449,812
1829.....	25,110	1856.....	400,425
1830.....	43,000	1857.....	400,751
1831.....	44,509	1858.....	425,896
1832.....	77,292	1859.....	546,816
1833.....	124,508	1860.....	517,157
1834.....	106,500	1861.....	410,877
1835.....	131,250	1862.....	241,837
1836.....	146,738	1863.....	517,259
1837.....	200,000	1864.....	517,180
1838.....	164,693	1865.....	517,025
1839.....	142,507	1866.....	400,000
1840.....	102,264	1867.....	370,204
1841.....	78,164	1868.....	453,821
1842.....	163,762	1869.....	563,914
1843.....	138,806	1870.....	468,272
1844.....	219,245	1871.....	762,682
1845.....	257,740	1872.....	1,014,890
1846.....	284,813	1873.....	1,081,153

The business of this company for 1874, is merged into that of the Lehigh and Wilkesbarre Coal Company, which is its successor.

THE WILKESBARRE COAL AND IRON COMPANY, began mining in 1869; merged into LEHIGH AND WILKESBARRE COAL COMPANY, in 1874. The business is shown below:—

Years.	Tons.	Years.	Tons.
1869.....	502,485	1873.....	1,278,307
1870.....	799,226	1874.....	2,479,382
1871.....	95,754	1875.....	2,085,038
1872.....	1,168,716	1876.....	2,300,555

The tonnage for 1876 and 1877 was produced:—

District.	1876.	1877.
At Wilkesbarre mines.....	1,284,119	1,234,859
At Summit Hill mines.....	606,773	550,519
At Honey Brook mines.....	409,663	411,486
Totals.....	2,300,555	2,196,864

## LEHIGH VALLEY RAILROAD CO.

Statement of the total coal tonnage, together with the tonnage east of Mauch Chunk, from year 1855 to date :—

Coal tonnage east of Mauch Chunk.			Coal tonnage east of Mauch Chunk.		
Year.		Total coal tonnage.	Year.		Total coal tonnage.
1855 (3 mo.).....	8,482	8,482	1866.....	1,730,474	2,037,714
1856.....	165,740	165,740	1867.....	1,948,385	2,080,156
1857.....	418,235	418,235	1868.....	2,225,630	2,603,102
1858.....	471,029	471,029	1869.....	2,015,293	2,310,170
1859.....	577,651	577,651	1870.....	2,810,020	3,608,586
1860.....	730,641	730,641	1871.....	2,210,272	2,889,074
1861.....	743,671	743,671	1872.....	3,009,395	3,850,118
1862.....	882,573	882,573	1873.....	3,189,023	4,144,339
1863.....	1,195,154	1,195,154	1874.....	3,016,636	4,150,659
1864.....	1,295,419	1,466,794	1875.....	2,417,800	3,277,571
1865.....	1,402,276	1,687,462	1876.....	3,129,895	3,951,513
			1877.....	3,453,533	4,362,124

The year ends with November 30.

Details of this company's business, for the year ending with November 30, 1877, are as follows :—

From Wyoming region.....	1,031,777 tons.
“ Hazleton region.....	2,121,358 tons.
“ Upper Lehigh region.....	699 tons.
“ Beaver Meadow region.....	577,452 tons.
“ Mauch Chunk region.....	6,099 tons.
“ Mahanoy region.....	624,738 tons.
Total in tons of 2,240 lbs.....	4,362,124 tons.

## LEHIGH AND SUSQUEHANNA RAILROAD.

Now operated by the

## CENTRAL RAILROAD OF NEW JERSEY.

Amount of coal carried over the Lehigh and Susquehanna railroad since its opening :—

Year 1868.....	1,058,054 tons.
Year 1869.....	1,297,825 tons.
Year 1870.....	1,354,052 tons.
Year 1871.....	1,033,587 tons.
Year 1872.....	2,527,068 tons.
Year 1873.....	3,089,697 tons.
Year 1874.....	2,972,286 tons.
Year 1875.....	2,661,635 tons.
Year 1876.....	2,952,520 tons.
Year 1877.....	2,969,788 tons.

Tons of 2,240 lbs.



## PHILADELPHIA AND READING RAILROAD CO.

We give the following table showing the business of the Philadelphia and Reading Railroad Company—tons of coal carried on main line and laterals, gross receipts from coal transported, and the number of miles of main line open for business, in the various years from 1850 to 1878 :—

Date.	Tons.	Dollars.	Miles.
1850.....	1,351,502	2,071,731	95
1851.....	1,650,270	2,018,871	95
1852.....	1,650,912	2,150,677	98
1853.....	1,582,248	2,254,694	98
1854.....	1,987,854	3,253,823	98
1855.....	2,213,292	3,664,095	98
1856.....	2,088,903	3,242,458	98
1857.....	1,709,692	2,412,923	98
1858.....	1,542,646	1,865,693	152
1859.....	1,632,932	1,883,685	152
1860.....	1,946,195	2,328,158	152
1861.....	1,639,535	2,111,023	152
1862.....	2,310,990	2,879,120	152
1863.....	3,065,261	4,897,200	152
1864.....	3,065,577	7,203,775	152
1865.....	3,090,814	8,627,292	152
1866.....	3,714,684	8,245,697	152
1867.....	3,446,826	6,404,878	152
1868.....	4,574,874	6,252,224	152
1869.....	4,239,457	8,346,240	152
1870.....	4,633,504	6,498,871	152
1871.....	6,002,573	8,287,233	260
1872.....	6,185,434	7,513,115	323
1873.....	6,546,553	9,104,094	327
1874.....	6,348,812	8,920,914	327
1875.....	5,505,455	7,636,699	327
1876.....	5,595,207	6,708,682	327
1877.....	7,255,818	7,505,207	327

Coal produced from the lands owned by the company during 1873-77, divided into that produced by the Philadelphia and Reading Coal and Iron Company, and that produced from lands of the company, leased to individual operators :—

Year.	Leases produced.	P. & R. C. & I. Co. produced.	Average cost at mines.
1873.....	2,055,565 tons.	1,318,838 tons.	\$2.51 per ton.
1874.....	1,802,370 tons.	1,374,790 tons.	2.45 per ton.
1875.....	1,594,741 tons.	1,510,572 tons.	1.87 per ton.
1876.....	1,218,533 tons.	1,853,364 tons.	1.35 per ton.
1877.....	1,389,108 tons.	3,794,528 tons.	1.04 per ton.

The ton used is that of 2,240 lbs. The figures for 1876 are for eleven months, to November 30.

Details of the company's business for the fiscal year, ending November 30, 1877 :—

	Paying Freight.	For Company's Use.
Received at Port Carbon.....	1,738,027 tons.	147,157 tons.
Received at Mount Carbon.....	208,062 tons.	14,631 tons.
Received at Schuylkill Haven.....	1,762,148 tons.	150,684 tons.
Received at Pine Grove.....	563,382 tons.	4,783 tons.
Received at Tamaqua.....	642,968 tons.	54,395 tons.
Wyoming and Lehigh coal.....	462,748 tons.	..... tons.
Bituminous coal.....	152,742 tons.	3,464 tons.
Carried by canal.....	815,543 tons.	..... tons.
Shipped Westward.....	422,413 tons.	19,431 tons.
Consumed on Laterals.....	92,734 tons.	..... tons.
Total tonnage for the year.....	6,860,771 tons.	394,546 tons.

The coal forwarded over main line and branches was distributed as follows :—

Years.	Line.	Philadelphia.	Port Richmond.
1863.....	548,755 tons.	388,352 tons.	2,128,154 tons.
1864.....	634,074 tons.	373,070 tons.	2,058,423 tons.
1865.....	659,376 tons.	380,283 tons.	2,051,202 tons.
1866.....	836,598 tons.	475,189 tons.	2,402,897 tons.
1867.....	935,694 tons.	386,933 tons.	2,121,189 tons.
1868.....	597,903 tons.	697,277 tons.	2,113,581 tons.
1869.....	923,504 tons.	888,633 tons.	2,362,972 tons.
1870.....	1,074,400 tons.	785,535 tons.	1,893,055 tons.
1871.....	1,128,227 tons.	923,539 tons.	2,311,393 tons.
1872.....	1,357,208 tons.	998,212 tons.	2,223,137 tons.
1873.....	1,670,188 tons.	1,075,255 tons.	2,266,892 tons.
1874.....	1,715,052 tons.	1,064,304 tons.	2,076,259 tons.
1875.....	1,197,449 tons.	923,850 tons.	1,713,978 tons.
1876.....	1,444,780 tons.	914,881 tons.	1,770,523 tons.
1877.....	1,429,510 tons.	1,022,726 tons.	2,825,101 tons.

—Tons of 2240 lbs.

#### SHIPMENTS OF SHAMOKIN COAL.

1877—East via Philadelphia and Reading railroad .....	867,663 tons.
“ East via Lehigh Valley railroad.....	47,334 tons.
“ West via Northern Central railroad.....	766,594 tons.
“ Sold at mines.....	4,572 tons.
“ Consumed at breakers.....	90,000 tons.

Total for 1877..... 1,776,163 tons.

Compared with 1876..... 1,391,752 tons.

—Tons of 2240 lbs.

As an indication of the rise and fall of prices, prior to, during, and after the collapse of the combination, we append the following prices, being those of Lehigh and Wilkesbarre Coal Co., for their "Wilkesbarre" coal; prepared expressly for this work.

1872.											
	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov. Dec.
Lump.....	4 00	3 75	3 75	3 75	3 75	3 75	3 75	3 75	3 60	4 00	4 00
Broken .....	4 40	3 85	3 85	3 85	3 85	3 85	3 85	3 85	3 85	4 35	4 40
Egg .....	4 50	3 85	3 85	3 85	3 85	3 85	3 85	3 85	3 85	4 35	4 50
Stove.....	5 25	4 25	4 25	4 35	4 35	4 25	4 25	4 25	4 10	4 60	5 00
Chestnut.....	4 25	3 75	3 75	3 80	3 80	3 80	3 80	3 80	3 60	4 10	4 00
1873.											
	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov. Dec.
Lump.....	4 25	4 45	4 45	4 45	4 55	4 65	4 75	4 85	4 95	5 05	5 05
Broken .....	4 45	4 65	4 65	4 65	4 75	4 85	4 95	5 05	5 15	5 25	5 25
Egg .....	4 70	4 90	4 90	4 90	4 90	5 00	5 10	5 20	5 30	5 40	5 40
Stove.....	5 15	5 35	5 35	5 00	5 10	5 20	5 30	5 40	5 50	5 60	5 70
Chestnut.....	4 35	4 45	4 45	4 45	4 55	4 65	4 75	4 85	4 95	5 05	5 05
1874.											
	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov. Dec.
Lump.....	5 05	5 05	4 55	4 60	4 70	4 80	4 95	5 10	5 25	5 40	5 55
Broken .....	5 25	5 25	4 75	4 80	4 90	5 00	5 15	5 30	5 45	5 60	5 75
Egg .....	5 40	5 40	4 90	4 95	5 05	5 15	5 30	5 45	5 60	5 75	5 90
Stove.....	5 70	5 70	5 35	5 40	5 50	5 65	5 80	5 95	6 10	6 25	6 40
Chestnut.....	5 05	5 05	4 85	4 40	4 50	4 60	4 75	4 90	5 05	5 20	5 35
1875.											
	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov. Dec.
Lump.....	5 55	5 55	4 40	4 60	4 80	4 90	5 00	5 00	5 05	5 05	5 05
Broken .....	5 75	5 75	4 60	4 80	5 00	5 10	5 20	5 20	5 25	5 25	5 25
Egg .....	5 90	5 90	4 75	4 95	5 15	5 25	5 35	5 45	5 55	5 65	5 65
Stove.....	6 40	6 40	5 30	5 40	5 60	5 70	5 85	5 90	6 00	6 10	6 10
Chestnut.....	5 35	5 35	4 35	4 40	4 60	4 70	4 80	4 90	4 95	4 95	4 95

## PRICES OF ANTHRACITE FOR 1876, F. O. B. AT SHIPPING POINTS.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Lump—Lehigh.....	\$5 55	\$5 25	\$4 90	\$4 90	\$4 95	\$5 00	\$4 75	\$5 20	\$4 00	\$3 25	\$4 00	\$3 75
Lump—Wilkesbarre.....	5 05	4 65	4 60	4 60	4 65	4 70	4 75	4 90	3 25	3 25	3 25	3 00
Grate—Lehigh.....	5 55	4 90	4 70	4 70	4 75	4 80	4 85	5 00	3 50	3 60	3 60	3 25
Grate—Wilkesbarre.....	5 25	4 75	4 80	4 80	4 85	4 90	4 95	5 10	3 50	3 60	3 60	3 00
Egg—Lehigh.....	5 65	5 00	4 70	4 70	4 75	4 80	4 85	5 00	3 60	3 60	3 60	3 25
Egg—Wilkesbarre.....	5 65	4 95	4 90	4 90	4 95	5 00	5 05	5 20	3 50	3 50	3 50	3 00
Stove—Lehigh.....	6 10	5 50	5 30	5 30	5 35	5 40	5 45	5 60	4 00	4 00	4 00	3 75
Stove—Wilkesbarre.....	6 00	5 50	5 50	5 50	5 55	5 60	5 65	5 80	4 00	4 25	4 25	3 75
Chestnut—Lehigh.....	5 10	4 85	4 60	4 60	4 65	4 70	4 75	4 90	3 30	3 30	3 60	3 50
Chestnut—Wilkesbarre.....	4 95	4 70	4 70	4 70	4 75	4 80	4 95	5 00	3 30	3 50	3 60	3 25

## PRICES OF ANTHRACITE FOR 1877, F. O. B. AT SHIPPING POINTS.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Lump—Lehigh.....	\$3 75	\$3 75	\$3 75	\$3 75	\$3 75	\$3 25	\$3 25	\$3 50	\$3 75	\$3 65	\$3 60	\$3 50
Lump—Wilkesbarre.....	3 00	2 75	3 00	2 90	2 90	2 65	2 65	3 15	3 25	3 00	2 60	3 00
Grate—Lehigh.....	3 25	3 25	3 25	3 25	3 25	2 85	2 85	3 65	3 65	3 25	2 85	3 25
Grate—Wilkesbarre.....	3 00	2 75	3 00	2 90	3 05	2 75	2 65	3 15	3 50	3 00	2 70	3 25
Egg—Lehigh.....	3 25	3 25	3 25	3 25	3 25	2 85	2 85	3 25	3 65	3 25	2 85	3 25
Egg—Wilkesbarre.....	3 00	2 90	3 10	2 95	3 10	2 75	2 65	3 15	3 55	3 00	2 75	3 50
Stove—Lehigh.....	3 75	3 75	3 65	3 65	3 65	2 85	2 75	3 25	3 75	3 25	3 00	3 35
Stove—Wilkesbarre.....	3 75	3 60	3 65	3 35	3 35	2 85	2 75	3 25	3 60	3 25	3 00	3 35
Chestnut—Lehigh.....	3 25	3 25	3 25	3 25	3 25	2 60	2 60	3 00	3 50	3 00	2 60	3 00
Chestnut—Wilkesbarre.....	3 35	3 25	3 25	3 00	3 00	2 60	2 60	3 15	3 30	3 00	2 60	3 00

## AVERAGES OF AUCTION SALES FOR 1877.—Scranton delivered f. o. b. at Hoboken, N. J. :—

AVERAGES OF AUCTION SALES FOR 1877.—Scranton delivered 1. O. C. at Rochester, N. Y.										
	Dec. 20, '76.	Jan. 24, Feb. 28, Mar. 20, April 25, May 29, June 27, Oct. 25, Nov. 26, Dec. 28.								
Steamer.....	\$2 86	\$2 65	\$2 83	\$2 80	\$2 96	\$2 50	\$2 18	\$2 32	\$2 30½	\$2 41
Grate.....	2 82½	2 67	2 77½	2 75	2 82½	2 39½	2 26½	2 45	2 25½	2 46
Egg.....	2 91	2 83	2 93	2 86	2 95	2 51	2 39	2 51	2 29	2 64
Stove.....	3 65½	3 48	3 51	3 23½	3 35	2 70½	2 56	2 86	2 58	3 08
Chestnut.....	3 20½	3 10	3 18	2 82	3 00	2 38	2 36	2 41	2 32½	2 70
Pittston f. o. b. at Weehawken* and Newburgh :—			Dec. 20, '76.*	Jan. 24.*	Feb. 28.*	Mar. 20.	May 29.	June 13.		
Lump.....	.....	.....	\$.....	\$.....	\$2 97	\$2 70	\$2 75	\$2 53		
Steamer.....	.....	.....	2 82½	2 82½	2 92	2 58	2 75	2 48½		
Grate.....	.....	.....	2 82½	2 82½	2 95	2 74	2 69	2 54		
Egg.....	.....	.....	2 82½	2 88½	2 93	2 72	2 80	2 51		
Stove.....	.....	.....	3 44	3 45	3 49	3 20	2 77½	2 53½		
Chestnut.....	.....	.....	3 08½	.....	3 26	3 07½	2 70½	2 45		

No Scranton sales in July, August, or September, on account of the labor troubles in coal region; the Pittston discontinued after June.



Shipments from the three sub-divisions of the Anthracite coal field for a series of years:—

Years.	Schuylkill.	Wyoming.	Lehigh.	Totals.
1864.....	2,642,218	3,960,836	2,054,669	10,177,475
1865.....	3,735,802	3,256,638	1,822,535	9,652,391
1866.....	4,633,487	3,736,616	2,128,867	12,703,882
1867.....	4,334,820	5,328,312	2,062,446	12,988,725
1868.....	4,414,356	5,990,813	2,507,582	13,834,126
1869.....	4,748,960	6,068,365	1,929,583	13,723,030
1870.....	3,720,403	7,599,902	3,040,303	15,849,899
1871.....	5,124,780	6,481,171	2,249,356	15,113,407
1872.....	5,106,451	9,194,808	3,610,674	19,026,125
1873.....	5,209,156	10,047,241	3,243,168	19,585,178
1874.....	5,891,666	9,445,446	4,404,000	18,980,726

We append comparative details of the Anthracite business, for the calendar years named, in tons of 2,240 lbs. It must be borne in mind that these figures represent the amount carried to market by the several routes:—

	1877.	1876.	1875.
LEHIGH: By Lehigh Valley road.....	3,355,612	2,872,211	2,286,242
C. R. R. of N. J.....	1,563,992	1,467,937	1,111,715
D. & H. Branch of Pa.....	35,000	41,736	69,887
WYOMING: By Del. & Hudson Co.....	1,929,248	2,006,509	3,056,479
D. L. & W. R. R. Co.....	2,072,000	2,054,019	2,970,693
Pa. Coal Co.....	1,064,583	1,086,475	1,368,207
C. R. R. of N. J.....	1,393,416	1,422,279	1,549,930
Lehigh Valley R. R.....	905,699	964,100	936,921
Pa. & N. Y. R. R.....	42,617	26,862	88,246
Pa. Canal.....	340,231	407,522	299,267
SCHUYLKILL: By Philadelphia & Reading.....	6,837,244	4,935,401	4,780,693
Shamokin.....	766,594	587,274	788,024
Williamstown, etc.....	315,675	564,342	768,973
Totals.....	20,619,911	18,436,667	20,075,287

The condition of the Anthracite trade during the year 1877, is fully shown in the low prices, and immense tonnages. Both results were due to disastrous competition. The trade as a whole, never passed through a more disastrous year, financially. New markets were made from the low prices, but it remains to be seen if we shall continue to hold them, when prices are put to anything like a profitable rate. The combination that has been formed, this year, holds the output well in hand, and much good may result therefrom. The extreme mildness of the last winter season has resulted in the carrying over of large stocks, which will compete with any new coal that may be shipped on the various markets, to be sold at higher prices.

## PENNSYLVANIA.

## NORTHERN PENNSYLVANIA SEMI-BITUMINOUS COAL FIELD.

The first coal from the Blossburg district in this coal field, was sent to market from the "Bloss" mines in 1840. The producers are the Fall Brook Coal Company, and Blossburg Coal Company, with mines near Blossburg, Tioga county, Pa. Seventy-five miles of railway, carries the coal from the mines to Seneca Lake, in New York State, where it is received into canal boats which deliver it by the canal system of water ways, throughout the State. The railway from the mines connects with the Erie Railway at Corning, N. Y., affording additional outlets to market, by the railways of the State and their connections, for the coal from this region; it being shipped as far west as Salt Lake City.

The most important seam is that known as the Bloss vein, a clean bed of pure coal, from  $4\frac{1}{2}$  to  $5\frac{1}{2}$  feet in thickness.

Statistics of the output are shown in the following schedule :

Year.	Tons.	Year.	Tons.
1840.....	4,235	1859.....	48,393
1841.....	25,966	1860.....	76,918
1842.....	13,164	1861.....	112,712
1843.....	6,268	1862.....	179,334
1844.....	14,234	1863.....	235,843
1845.....	29,836	1864.....	384,977
1846.....	16,509	1865.....	394,642
1847.....	29,807	1866.....	411,759
1848.....	33,763	1867.....	481,318
1849.....	32,095	1868.....	602,328
1850.....	23,161	1869.....	715,094
1851.....	25,000	1870.....	733,035
1852.....	20,000	1871.....	815,079
1853.....	45,507	1872.....	849,262
1854.....	70,214	1873.....	991,057
1855.....	73,204	1874.....	796,388
1856.....	70,669	1875.....	581,782
1857.....	94,314	1876.....	616,984
1858.....	41,894	1877.....	602,245

The Barclay district is located in Bradford county, Pa., some thirty-six miles south from Waverly, N. Y. The mines are owned by the Fall Creek Bituminous Coal Company, the Erie Railway Company, (comprising the lands formerly of the Barclay,) the Towanda Coal Company, and the Schradder Coal Company.

The table which we give on the next page shows the amount of coal shipped from the Barclay coal regions, by the several companies which have operated it.

Year.	Barclay Coal Co.	Towanda Coal Co.	Fall Creek Coal Co.	Total Products.
1856.....	2,295	—	—	2,295
1857.....	6,265	—	—	6,265
1858.....	17,560	—	—	17,560
1859.....	30,143	—	—	30,143
1860.....	27,718	—	—	27,718
1861.....	40,835	—	—	40,835
1862.....	52,779	—	—	52,779
1863.....	54,535	—	—	54,535
1864.....	62,058	—	—	62,058
1865.....	48,375	7,886	16,936	73,197
1866.....	37,968	31,881	29,604	99,453
1867.....	30,119	27,668	16,953	74,739
1868.....	—	67,080	6,595	73,675
1869.....	—	176,307	4,303	180,610
1870.....	—	196,310	77,025	273,335
1871.....	—	249,240	129,095	378,335
1872.....	Schrader	263,960	118,882	382,842
1873.....	Coal Co.	252,329	85,315	337,644
1874.....	100,219	215,572	21,281	337,072
1875.....	157,686	200,424	18,507	376,637
1876.....	200,795	160,343	—	361,138
1877.....	175,757	164,344	—	340,101

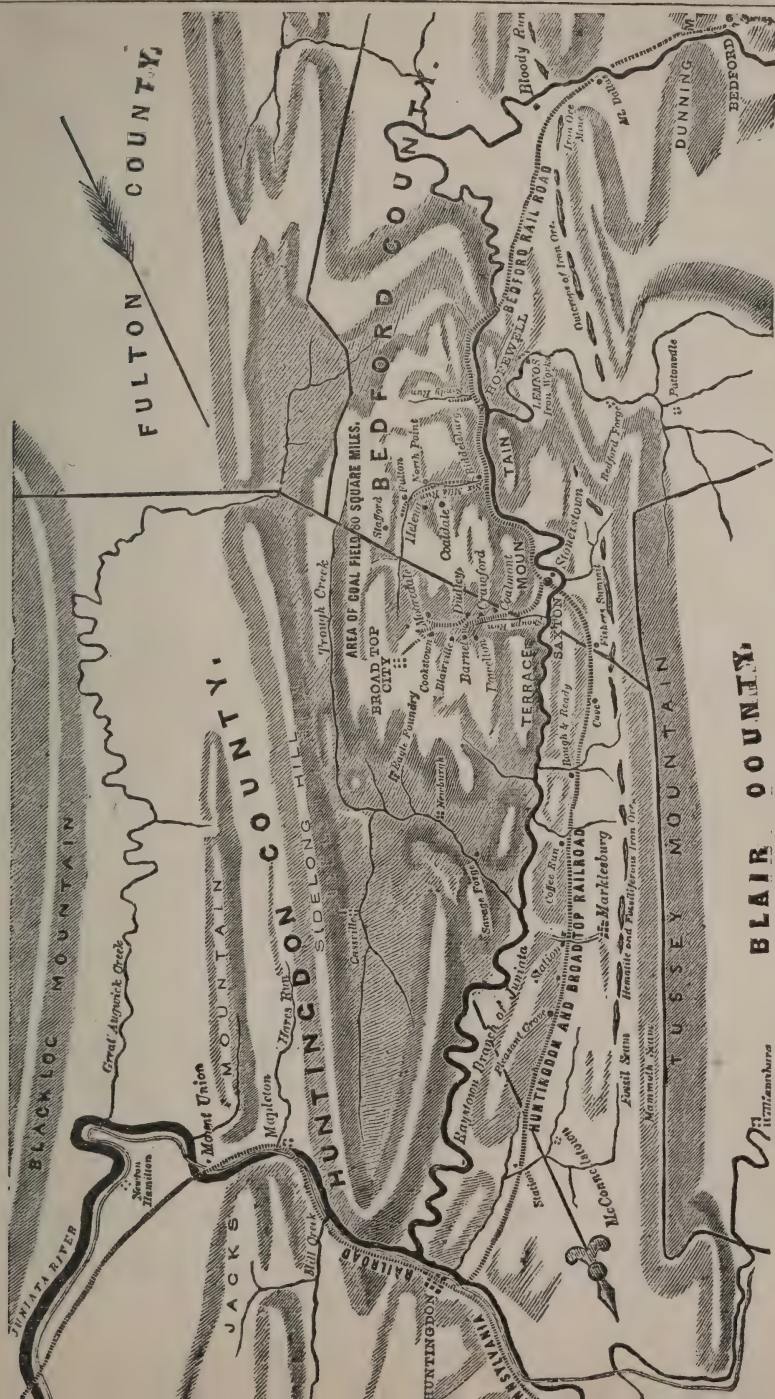
The McIntyre Coal Co., whose mines are at Ralston, Pa., on the Northern Central Railway (54 miles south from Elmira, N. Y.,) which gives them an outlet both north and south to a market, commenced operations in 1870. Statistics of their business are as below :—

Years.	Tons.	Years.	Tons.
1870.....	17,802	1874.....	138,907
1871.....	106,138	1875.....	164,507
1872.....	171,420	1876.....	208,701
1873.....	212,462	1877.....	183,715

Since the opening of the mines of the Blossburg district, in 1840, the shipments by each company have been as follows :—

Arbon Coal Company, 1840-1843.....	49,633 net tons.
Wm. M. Mallory, 1844-1857.....	405,113 net tons.
D. S. Magee, 1856-59.....	78,996 net tons.
Tioga Transportation Company.....	323,174 net tons.
Salt Company of Onondaga, 1863-1866.....	267,809 net tons.
Morris Run Coal Company, 1864-1877.....	3,719,486 net tons.
Fall Brook Coal Company, 1860-1877.....	3,363,615 net tons.
Blossburg Coal Company, 1866-1877.....	2,027,937 net tons.
Total production of the district.....	10,285,746 net tons.





MAP OF THE BROAD TOP COAL AND IRON REGION.



## BROAD TOP SEMI-BITUMINOUS COAL FIELD.

The area of this coal field is stated at eighty square miles, and the aggregate thickness of workable coal seams is 26 feet, the larger seams range from five to ten feet in thickness, and the lesser from one to three.

An outlet for the coal from this region is afforded by the Huntingdon and Broad Top Mountain Railroad (this was completed in 1856, and during the latter part of that year 42,000 tons were forwarded from this region to various markets.) This line extends from the town of Huntingdon, on the Pennsylvania Railroad, 203 miles west of Philadelphia, to Mt. Dallas in Bedford county, a distance of 45 miles. At Saxton, 24 miles from Huntingdon, a branch road, 10 miles in length, extends to Broad Top City; at Riddlesburg, 5 miles beyond Saxton, is another branch in to Fulton, 5 miles from the main road.

From Mt. Dallas the Bedford and Bridgeport Railroad, 38<sup>5-10</sup> miles in length, extends to the Maryland State line; from this point to Cumberland, Md., via the Cumberland and Piedmont Railroad, is 7 miles. This connection gives an outlet to the Cumberland coal to the interior markets of Pennsylvania, to Philadelphia and South Amboy, N. J. The Bedford and Bridgeport road is leased to the Pennsylvania Railroad and operated by them.

The yearly shipments from this region, by the H. & B. T. R. R., have been as follows:

Year.	Tons.	Year.	Tons.
1856.....	42,000	1867... ..	244,412
1857.....	78,813	1868.....	280,936
1858.....	105,478	1869.....	360,778
1859.....	130,595	1870.....	313,425
1860.....	186,903	1871.....	319,625
1861.....	272,625	1872.....	297,473
1862.....	333,606	1873.....	350,245
1863.....	305,678	1874.....	226,693
1864.....	386,645	1875.....	204,921
1865.....	315,906	1876.....	159,779
1866.....	265,720	1877.....	140,143

The East Broad Top railroad penetrated this coal field in 1875, and carried 53,567 tons of coal during that year, and 66,104 in 1876, and 54,738 in 1877.

The shipments of Cumberland coal over the Pennsylvania State line, and Huntington & Broad Top railroad, have been as below:—

Year.	Tons.	Year.	Tons.
1872.....	22,021	1875.....	175,154
1873.....	114,589	1876.....	145,796
1874.....	67,671	1877.....	187,488

## SNOW SHOE SEMI-BITUMINOUS COAL FIELD.

This region is located in Centre county, Pennsylvania. It covers an area of about eight miles in length, and some four miles in breadth, and is situated on both sides of Beach Creek. The coal finds an outlet to market, via the Bellefonte and Snowshoe, and Bald Eagle Valley connections of the Pennsylvania Railroad; it being 47 miles from Snowshoe to Tyrone, on the main line.

There is but one company mining in this district. It commenced operations in the year 1862, with 8,260 tons, and has increased as below:—

Year.	Tons.	Year.	Tons.
1862.....	8,260	1869.....	89,356
1863.....	12,039	1870.....	85,276
1864.....	23,593	1871.....	79,984
1865.....	51,881	1872.....	68,988
1866.....	70,890	1873.....	95,257
1867.....	58,137	1874.....	63,540
1868.....	60,149	1875.....	62,426
1876.....		1876.....	51,399
1877.....		1877.....	42,985

Prof. Rogers gives this Snowshoe coal 78.8 of Fixed Carbon, and 21.2 of Volatile Matter and Ashes.

## CLEARFIELD REGION.

This coal field is located in Clearfield and Central counties, in the central portion of the State of Pennsylvania; for an outlet for the products of its mines it is dependent upon the Tyrone and Clearfield branch of the Pennsylvania railroad, extending from Tyrone on the main line, (224 miles west from Philadelphia), to Clearfield, 41 miles. The Pennsylvania Railroad Company owns the railroads, the shipping wharves, and all the means of access to the markets of the Atlantic seaboard; the advantage of being connected with a railroad of such magnitude, with its wonderful ramifications and connections, gives the coal proprietors of this region great facilities for the proper conduct of their business, and it is owing to the very liberal policy of this corporation, that the district has been enabled to take the rank which it has assumed, in connection with the fuel supply of the seaboard. The figures given of the production, show that the market for this quality of coal has steadily increased, while other districts fell off; its introduction at New York and the East, having been most successful during the past year or two.

The coal is used for steam purposes under stationary, marine, or locomotive engines, for making iron and steel rails, for glass works, in lime kilns, and many other purposes, being much liked wherever used; ignites freely, burns readily, and leaves a white ash. It is not easily friable, and bears transportation remarkably well.



The last report of the State Geological Survey, says:—"It may be noted here that these coals are frequently, perhaps usually, termed semi-Bituminous coals. They are truly Bituminous, having over twenty per cent. of volatile matter on the average, while the term semi-Bituminous belongs to the Cumberland, Towanda, Blossburg, etc. coals, which average between fifteen and twenty per cent. of volatile matters."

We take the following analyses from the geological report:—

No.	Volatile		Fixed		Coke.	
	Water.	Matter.	Carbon.	Sulphur.	Ash.	Per cent.
1.....	.81	20.640	74.023	.507	4.02	73.550
2.....	.67	21.360	74.284	.435	3.25	77.970
3.....	.78	21.650	73.952	.688	3.50	77.340
4.....	.71	23.400	72.218	.532	3.14	75.890
5.....	7.65	20.090	74.779	.666	3.70	79.145
6.....	1.10	23.070	71.199	.611	4.02	75.830
7.....	1.16	22.450	72.300	....	4.15	.....
8.....	.57	24.630	68.40	1.900	4.50	74.800
9.....	.74	25.210	68.628	2.122	3.30	74.050
10.....	.70	23.565	68.89	1.715	5.13	75.735
11.....	.62	22.135	68.728	.867	7.65	77.245
12.....	.80	23.260	72.35	.590	3.00	75.940
13.....	.64	24.36	64.082	3.378	7.54	75.00
14.....	.82	23.90	69.007	1.373	4.90	76.28
15.....	.65	24.09	71.689	.571	3.10	75.36
16.....	.56	25.19	71.013	.587	2.65	74.25
17.....	.41	22.81	66.69	.179	8.30	76.73

- No.
- 1.—Penn colliery, Houtzdale, five and one-half miles southwest of Osceola.
  - 2.—Franklin colliery, Houtzdale, five and one-half miles southwest of Osceola.
  - 3.—Eureka mine, Houtzdale, five and one-half miles southwest of Osceola.
  - 4.—Sterling mine, Houtzdale, five and one-half miles southwest of Osceola.
  - 5.—Moshannon colliery, on Beaver branch of Moshannon, three and one-half miles S.W. of Osceola.
  - 6.—New Moshannon mine, north side of Beaver branch of Moshannon, three and one-half miles southwest of Osceola.
  - 7.—New Moshannon mine, analyzed by Booth & Garrett.
  - 8.—Hale's colliery, one mile north of Osceola. Upper bed.
  - 9.—Hale's colliery, one mile north of Osceola. Lower bed.
  - 10.—Mapleton colliery, on Shimmel's run, one and one-half miles north of Osceola.
  - 11.—Logan colliery, on Shimmel's run, two miles north-west of Osceola.
  - 12.—Laurel run colliery, on Shimmel's run, two miles north-northwest of Osceola.
  - 13.—Decatur Coal Co.'s colliery, one-half mile north of Philipsburg, Centre Co. Lower bench.
  - 14.—Decatur Coal Co.'s colliery one-half mile north of Philipsburg, Centre Co. Upper bench.
  - 15.—Morrisdale mine, three miles north-northwest of Philip-burg. Lower bench.
  - 16.—Morrisdale mine, three miles north-northwest of Philipsburg. Upper bench.
  - 17.—Derby colliery, one-half mile west of Philipsburg.

The coal measures are found to be admirably adapted for working, dipping gently toward the Moshannon creek, which flows through the centre of the basin. The lowest seam of coal (A), five feet thick, crops out on the level of this stream. The next, (B), sixty feet above, is three to four feet in thickness. Fifty feet above is another seam, (C), ranging from two to three and a half feet in thickness. Again, fifty feet above, is found a seam, (D), of five feet of good solid coal.

The rate of wages paid in this coal field, during 1877, were only forty cents per ton for the digging of the coal; this was lower than in competing regions, and is one of the causes, in connection with the favorable arrangements made with the carrying company, that enabled the region to make so large an increase in the matter of product.



We give below statistics of the product from the beginning :—

In the year 1867.....	169,219 tons.
In the year 1868.....	171,238 tons.
In the year 1869.....	259,994 tons.
In the year 1870.....	379,863 tons.
In the year 1871.....	542,896 tons.
In the year 1872.....	431,915 tons.
In the year 1873.....	592,860 tons.
In the year 1874.....	639,630 tons.
In the year 1875.....	928,297 tons.
In the year 1876.....	1,281,861 tons.
In the year 1877.....	1,374,927 tons.

#### MYER'S MILLS OR SALISBURY REGION.

This district is located in Somerset county, Pennsylvania, adjoining the Cumberland region, of Maryland, and the coal is stated to be similar to, and an extension of the Cumberland coal basin. The coal is of the same quality and will yield a similar quantity per acre. It is eleven miles from Frostburg, Md., and the coal finds an outlet to Baltimore and the seaboard markets over the Pittsburgh and Connellsville branch of the Baltimore and Ohio railroad. The Keystone Coal Company have been at work here since 1872, and built up a business amounting to 69,313 tons in 1877. The property of the company is advantageously situated for the shipment of its production, and the rate of transportation from the mines to market is very favorable. The Cumberland and Elk Lick Coal Company own 1,500 acres of land in this district, and during 1876, sent to market some 39,919 tons, which was increased to 79,363 tons in 1877.

Myer's Mills, which may be stated as the centre of the district, is 217 miles from Baltimore, and 112 miles from Pittsburgh, by present routes.

The first coal seam rests on a thin floor of fire clay. The coal bed has two benches ; the lower, 18 inches thick, is an impure Cannel coal, circling to block structure ; the upper is a medium quality of semi-Bituminous coal with the well-marked columnar structure peculiar to Allegheny coals.

The interval between this and the next small coal seam is composed of thin plates of sandstones with olive-colored shales.

The second workable seam (B) is pre-eminently the *bed* of the lower system of coal measures ; not perhaps, so much from its size and good quality of coal, as from its ready and sure identification, wherever it exists, by the massive bed of limestone on which it rests. The farmers trace it from hillside to hillside, regarding it with peculiar affection as a *double gift*—not only supplying fuel for domestic use, but also with lime to enrich the “glades” in their mountain farms.

The coal in this bed is columnar in structure with plates of mineral charcoal disseminated. In structure and quality it is closely associated with

the best Clearfield coal. It will be found a superior fuel for iron working.

The third seam (C) is all pure coal of an excellent quality ; but as the bed is high in the measures and does not occupy a wide area in this portion of the field, it has as yet received little attention.

From seam (B), to the top of the scale, the measures are composed of very soft flesh and olive-colored shales, which have been rounded and softened into easy rolling slopes and rounded hills.

#### WESTMORELAND REGION.

The celebrated Penn and Westmoreland Gas coal is mined near Penn and Irwin stations, on the Pennsylvania railroad, in Westmoreland county ; the distance from Philadelphia is 332 miles. The coal mined is the great Pittsburgh bed of Bituminous coal ; the companies operating in this region are large and influential, among them being the Penn Gas Coal Company, and the Westmoreland Gas Coal Company. The coal is used in every seaboard city for gas purposes, and always commands the highest price, in fact it makes the rate for all other gas-producing coal that reaches the seaboard. The shipping points are South Amboy, N. J., and Greenwich, (on the Delaware river), below Philadelphia. Shipments have been as below :—

Year.	Tons.	Year.	Tons.
1874.....	952,971	1876.....	902,139
1875.....	769,968	1877.....	786,039
Coke in 1876.....	60,094	Coke in 1877.....	64,905

This coal is in great favor among gas engineers in the United States.

In the dry way, by the ordinary process, the Westmoreland coal yields on an average sample as follows :—

Charge, 224 pounds, carbonized 3 h. 20 m., produced.....	9,500 cubic ft.
Illuminating power, standard Argand.....	16.52 candles.
Weight of coke, per ton.....	1,544 pounds.
Bushels of coke, per ton.....	40
Maximum yield of gas, per ton.....	10,642 cubic ft.
One bushel of lime purified.....	6,420 cubic ft.

Analysis of the coal :—

Volatile matter.....	36 per cent.
Fixed carbon.....	58 per cent.
Ash.....	6 per cent.

100

Value of the gas from one ton estimated in pounds of spermacetti..... 541.26 pounds

The above results were obtained in the experimental works of the Manhattan Gas Light Company, New York, where the daily average yield of gas from this coal and its equivalent, the Penn. is about 10,000 cubic feet of seventeen candle gas.

## MONONGAHELA REGION.

By means of its slack-water navigation, the Monongahela river is made navigable at all seasons of the year, and boats carrying eight hundred tons are passed down. The city of Pittsburgh is supplied mainly by railroad, and the larger portion of the coal by river, is run down the Ohio and Mississippi to the lower markets. The boats in use are known as "broad horns," carrying 20,000 bushels, "barges," carrying 11,000 bushels, and "flats," carrying 2,000 bushels. The following statement of shipments by the slack-water navigation, from 1845 to date, is of interest :—

Year.	*Tons.	Year.	*Tons.
1845. . . . .	184,200	1862. . . . .	743,358
1846. . . . .	311,156	1863. . . . .	1,134,150
1847. . . . .	385,805	1864. . . . .	1,402,828
1848. . . . .	392,774	1865. . . . .	1,500,791
1849. . . . .	398,340	1866. . . . .	1,704,212
1850. . . . .	491,918	1867. . . . .	1,202,908
1851. . . . .	490,850	1868. . . . .	1,812,040
1852. . . . .	585,233	1869. . . . .	2,100,504
1853. . . . .	628,654	1870. . . . .	2,303,855
1854. . . . .	693,278	1871. . . . .	1,944,852
1855. . . . .	889,360	1872. . . . .	2,291,220
1856. . . . .	353,364	1873. . . . .	2,094,312
1857. . . . .	1,158,939	1874. . . . .	2,503,504
1858. . . . .	1,027,866	1875. . . . .	2,275,265
1859. . . . .	1,131,467	1876. . . . .	2,495,800
1860. . . . .	1,517,909	1877. . . . .	2,677,460
1861. . . . .	834,630		

\*We have estimated 25 bushels, of 80 lbs., to the ton of 2000 lbs.

The business done by the various railroads, entering or passing through this coal field, is indicated by the fact that in 1877, the Pennsylvania railroad carried upwards of 1,374,396 tons from this district; the reader is referred to the details of the business done at the city of Pittsburgh, for figures of other railroads to which this region is tributary. In this connection, the cost of transporting coals over waterways, as—for instance—from Pittsburgh to New Orleans, is of value. The distance is something like 2000 miles, the rate is about  $3\frac{3}{4}$  cents per bushel, or \$1.05 per ton of 2240 lbs; the ordinary time being about two weeks, when all circumstances are favorable. From Pittsburgh to Louisville, Ky., the distance is six hundred miles; the cost  $1\frac{3}{4}$  cents per bushel, including return of empty craft; and the time five days. Coke forms a considerable item in the business from this region. Some 107,000 tons were shipped last year. It weighs 40 lbs. to the bushel, and  $62\frac{1}{2}$  lbs. of coke represents 100 lbs. of coal, so that of the total product of this region in 1877—1,518,182 tons was sent out by rail.



## SONMAN REGION.

This district is in Cambria county; the coal is worked in the same vein that is mined in Clearfield county; the coal here has a heavier cover than where found in the adjoining county of Clearfield; is strong, and partakes somewhat of the nature of the gas coal found in Westmoreland county, which adjoins it on the southwest; the trade has increased during the past three years, shipments having been made to all tide water ports—to New England, Baltimore, Chicago, Cleveland, etc., at the west, and along the line of the Pennsylvania railroad; it has not only maintained its place, but gained in favor.

An analysis made of Sonman vein White Ash coal, by Dr. C. M. Cresson, gave the following results, as compared with Broad Top and Westmoreland:—

	Sonman.	Broad Top.	Westmoreland.
Volatile matter.....	18.30	17.85	32.85
Fixed carbon.....	78.60	74.65	61.45
Ash.....	2.70	7.50	5.80
Sulphur.....	0.40	1.85	1.04

The ash consists of alumina, silica and lime. Does not produce clinker. The yield of coke showed 82.30 per cent.; taking the Penn coal at 1,000 as the standard for steam purposes, Sonman coal is equivalent to 959.

## McKEAN COUNTY, PENNSYLVANIA.

In the southern part of McKean county, in what is known as the fifth coal basin, is an important coal district, which from its vicinity to the Buffalo and Rochester markets, is entitled to our attention and notice.

No other coal basin contains so large a body of coal, at its northern extremity as this, owing probably to its being situated on the dividing waters, where the work of denudation has been less destructive. The McKean and Buffalo railroad, which extends from Larrabees, on the Buffalo, New York and Philadelphia railroad, to Smethport, a distance of twenty-two and one-half miles, gives an outlet for the coal from this district, the distance from Smethport being but one hundred and eight miles to Buffalo, and one hundred and fifty to Rochester.

Analyses and practical tests of considerable quantities of this coal, under stationary and locomotive boilers, indicate that it is a good quality of Bituminous coal, with excellent steam generating qualities. A company known as the "Buffalo Coal Company," is developing this region. The product, last year, was about 75,000 tons. We give the following analyses of three samples, from the Pennsylvania Geological Survey Report of 1875:—

Water.....	1.130	1.300	1.170
Volatile matter.....	33.090	39.830	35.440
Fixed Carbon.....	53.006	52.063	43.992
Sulphur.....	1.874	1.727	1.708
Ash.....	10.900	5.080	17.690



## WEST VIRGINIA GAS COAL.

That class of gas coal known in the New York and Eastern markets as "West Virginia Gas Coal," is mined in Marion, Taylor, Ritchie and Preston counties, West Virginia, the mines being located near to or upon the main line of the Baltimore and Ohio railway. The coal is used for gas making in the cities of the seaboard, and is very favorably spoken of. The distances to Baltimore are as follows:—From Clarksburg, 301 miles; from Fairmount, 302 miles; from Newburg, 263 miles; from Tunnelton, 260 miles, from Cairo, 355 miles.

The veins are from six to eleven feet in thickness. Analyses of these coals have given the following results:—

	Volatile matter.	Fixed carbon.	Ash.
Clarksburg, main seam.....	56.74	41.66	1.60
Clarksburg Cannel.....	49.21	45.43	5.36

The trade to the seaboard began in the year 1868, with 165,772 tons.

Years.	Tons.	Years.	Tons.
1868.....	165,772	1873.....	190,673
1869.....	269,158	1874.....	125,000
1870.....	249,879	1875.....	100,000
1871.....	189,763	1876.....	100,000
1872.....	217,569	1877.....	100,000

In addition to the outlet eastward via Baltimore and Ohio railroad, there is the Parkersburg route due west, crossing the Monongahela river at Clarksburg, and thence to the Ohio river at Parkersburg; and the Wheeling route northwestward, crossing the Monongahela at Fairmount, thence down the creek to the Ohio, and thence up the river to Wheeling. Both these branches enter the main coal measures near the crossing of the Monongahela above named, and traverse them to the Ohio. At Clarksburg and northward, down the Valley of the Monongahela, is one of the richest coal regions of West Virginia. One of the beds in the neighborhood of this town measures from ten to twelve feet in thickness, with a thinner bed of more highly Bituminous nature underlying; from some distance above Clarksburg, they may be followed with scarcely an interruption throughout the whole Valley of the Monongahela, northward to Pittsburgh. The improvement of this river, will enable large quantities of this truly valuable coal to be shipped to the markets of the West and Southwest.

The cause for a diminution of the trade to the seaboard, is the cheaper gas coal furnished from Great Britain and the Provinces, due to the low water freights. The introduction of coal from the Kanawha district, and the discriminating policy of the Baltimore and Ohio road, have also affected this region.

See pages 48 and 57 for coal business, and description of the Kanawha (W. Va.) district.

## THE CUMBERLAND REGION.

The Cumberland (George's Creek) coal field, located in Alleghany county, at the western extremity of the State of Maryland, supplies an important proportion of the semi-Bituminous coal, reaching the seaboard markets. The connection with the tide-water markets are via the Baltimore and Ohio railroad, from the town of Cumberland, 178 miles, and Piedmont, 206 miles, west from Baltimore. The Chesapeake and Ohio canal, following the Potomac river to Georgetown, 184 miles, and Alexandria, 191 miles from Cumberland. The boats carry 110 tons, and make the trip in four to five days. Steam canal boats have been introduced on this waterway with considerable success, in point of time and economy of movement. The canal is owned by the State, and is managed by a Board of Public Works.

The mines of this George's Creek coal field are located near to, or upon the line of the Cumberland and Pennsylvania branch road, extending through the region, say, one and one-half to twenty miles from Piedmont, and from eleven to thirty-three miles from Cumberland. The mines are with one exception, (the Borden shaft) drift openings in the hillside; the coal being let down inclined planes, ranging from 300 to 2,000 feet in length, to the main railroad, which follows the descent of the stream towards Piedmont.

Of the quality of the production of the mines in this district, it is almost unnecessary to speak. It is of superior quality, and has stood the test for thirty-five years. The seam of coal worked is known to be fourteen feet in thickness, its full extent is seldom taken out, however, from various causes.

Labor in this region has always been well remunerated, and there was no reduction in the price of mining the coal, from 1866, up to 1877, while on the other hand, the price of coal at the shipping points fell off about one-half within that period of time. We append a few statistics in this connection, showing the changes that have occurred:—

*Rates per ton paid for digging, in rooms, in Cumberland region.*

1855—June, 35 cents, at which rate it remained until August, when it was reduced to 30 cents.

1856—January, to May 1862, 30 cents.

1862—In June advanced to 40 cents, and in September to 45 cents.

1863—January, to March 1864, 50 cents.

1864—In April advanced to 60 cents, and in June to 75 cents.

1864—September, to May 1865, \$1.00

1865—In June, reduced to 75 cents, at which it continued to May, 1866.

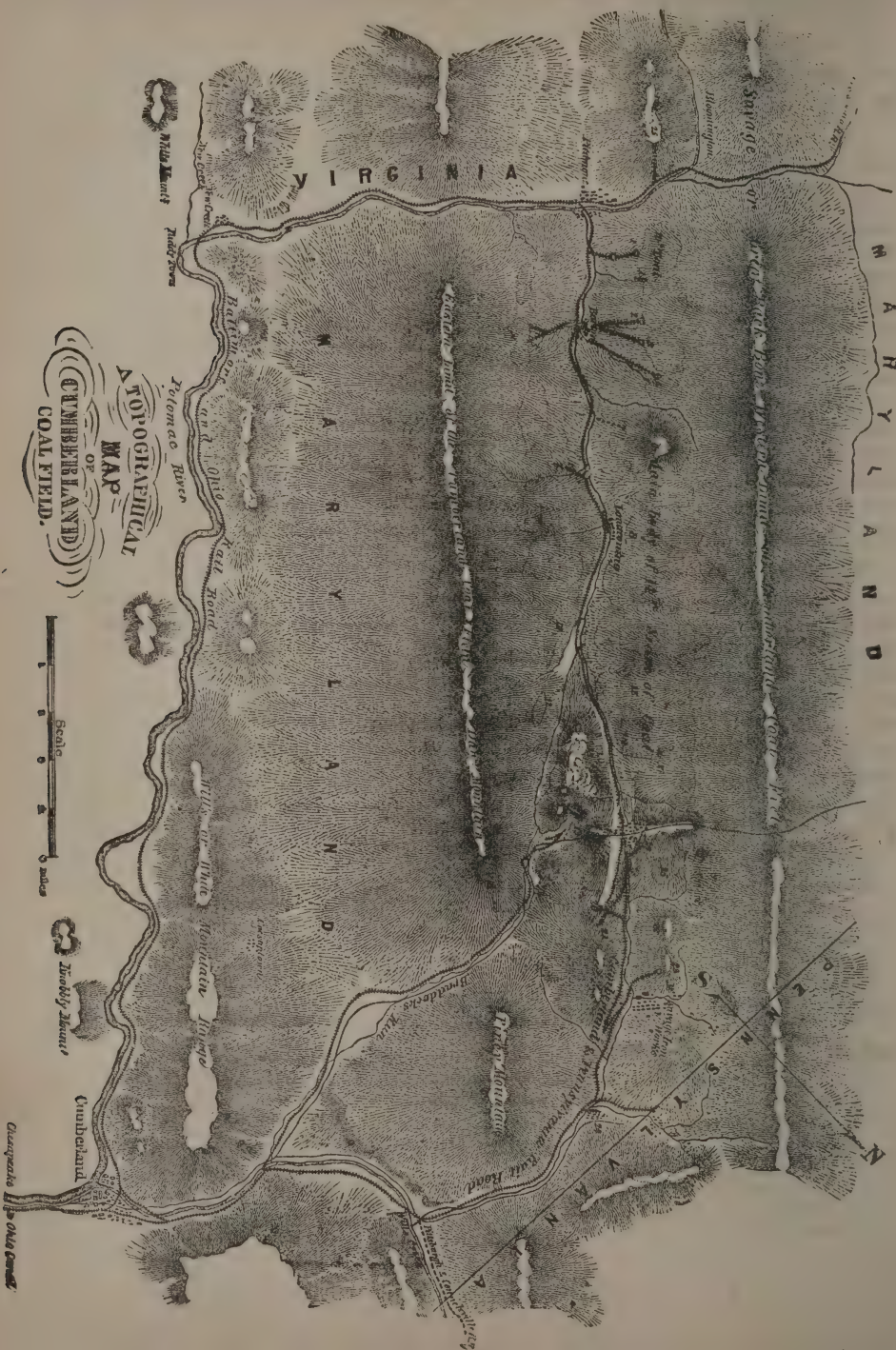
1866—May, to January 1877, it was reduced to 65 cents.

1877—In January, reduced to 50 cents; advanced in August to 55 cents.

1878—March, 40 cents.

In the year 1842, the product of this coal field was shipped to tide-water markets over the Baltimore and Ohio railroad. The Chesapeake and Ohio canal was finished to Cumberland, Md., in 1850.





In the fall of the year 1872, there was built a line from the Pennsylvania railroad to tap the Cumberland road, the connection being made at or near Mt. Savage.

The following tables will show the business that has been done from this region:—

*Forwarded by Baltimore and Ohio Railroad.*

Years.	Tons.	Years.	Tons.	Years.	Tons.
1842.....	1,708	1854.....	503,836	1866.....	736,153
1843.....	10,082	1855.....	478,486	1867.....	735,669
1844.....	14,890	1856.....	502,330	1868.....	848,118
1845.....	24,653	1857.....	465,912	1869.....	1,230,518
1846.....	29,795	1858.....	395,405	1870.....	1,112,938
1847.....	52,940	1859.....	426,512	1871.....	1,491,814
1848.....	79,571	1860.....	493,031	1872.....	1,517,347
1849.....	142,449	1861.....	172,075	1873.....	1,780,710
1850.....	192,806	1862.....	218,950	1874.....	1,576,160
1851.....	174,701	1863.....	531,553	1875.....	1,302,237
1852.....	268,459	1864.....	399,354	1876.....	1,070,775
1853.....	376,219	1865.....	560,293	1877.....	818,369

*Forwarded by Chesapeake and Ohio Canal.*

Years.	Tons.	Years.	Tons.	Years.	Tons.
1850.....	4,042	1859.....	297,842	1868.....	482,325
1851.....	82,978	1860.....	295,878	1869.....	652,151
1852.....	65,719	1861.....	97,599	1870.....	604,137
1853.....	157,760	1862.....	98,684	1871.....	850,339
1854.....	155,845	1863.....	216,792	1872.....	816,103
1855.....	183,786	1864.....	258,642	1873.....	777,802
1856.....	204,120	1865.....	343,202	1874.....	767,064
1857.....	116,574	1866.....	343,178	1875.....	879,838
1858.....	254,251	1867.....	458,153	1876.....	632,440
		1877.....	584,996		

*Forwarded over Pennsylvania State Line Branch.*

Year.	Tons.	Year.	Tons.
1872.....	22,021	1875.....	160,698
1873.....	114,589	1876.....	131,866
1874.....	67,671	1877.....	170,884

The average price for this coal f. o. b. at Baltimore, forms an interesting feature in connection with the trade therein:—

Year.	Average Price at Baltimore.	Year.	Average Price at Baltimore.
1861.....	\$3 44	1866.....	\$5 94
1862.....	4 23	1867.....	4 97
1863.....	5 57	1868.....	4 71
1864.....	6 84	1869.....	4 37
1865.....	7 57	1870.....	4 72



Year.	Average Prices at Baltimore.	Year.	Average Prices at Baltimore.
1871.....	\$4 72	1874.....	\$4 68
1872.....	4 66	1875.....	4 42
1873.....	4 85	1876.....	3 75
1877.....		1877.....	3 15

During the year 1877 the operators in this district experienced as severe a season as has been known in the annals of the industry. The low price of Anthracite coal proved a serious object of competition. The Canal Company endeavored to foster the trade by reduction of the toll charges, and through this and the low rates of freight may be recorded the increase of the business over this avenue to tide-water. Had it not been for this wise movement, we should be under the necessity of reporting a still larger decrease in the sum total of the production, as compared with 1876. As it is, it foots up a quarter of a million tons. Considerable time was lost last summer from an ineffectual effort to reduce the wages of the working miners. The rates for coal at Baltimore and Georgetown were low; coast wise freights were favorable. This season may show an improvement in all this, as the cost of digging the coal has been reduced fifteen cents per ton, from what it closed at last season.

The Cumberland and Pennsylvania railroad is acting with the operators, and with any disposition on the part of the Baltimore and Ohio railroad and the Canal, we may look forward to an increased tonnage, as compared with 1877. The course of action pursued by the Anthracite companies has an important bearing upon this trade, and should steam sizes of Anthracite be put to anything like rates necessary to pay expenses, the Bituminous coals will have an opportunity to increase business at paying rates. The scheme to construct a narrow-gauge road from Lonaconing to Cumberland, was not carried forward last season, but a start has been made this year. It will help the operators of this district as furnishing an additional outlet for coal to the canal.

The total business in this district since the beginning, in 1842, to the end of 1877, foots up 32 090,877 tons, divided as below :—

Baltimore and Ohio railroad.....	20,739,908 tons.
Chesapeake and Ohio canal.....	10,683,240 tons.
Pennsylvania railroad.....	667,729 tons.

Reference was made in our last annual report, to the coal from the smaller veins. There continues a determined effort to develop, on the part of owners of land, where these seams are available. While we hold the opinion that the coal from these seams may not be wanted for some time, it is highly desirable that the extent and quality thereof may be exactly known, inasmuch as the most sanguine operators put the life of the big vein, at a generation only.

The following statement shows the production of each company, operating in this region, during the years 1875, 1876 and 1877:—

Company.	Tons in 1877.	Tons in 1876.	Tons in 1875.
Consolidation.....	348,385	356,817	440,923
New Central.....	346,038	241,218	258,847
George's Creek Coal and Iron Company.....	121,553	198,796	166,357
Atlantic and George's Creek.....	96,211	149,930	122,916
Borden.....	97,907	145,818	232,458
American.....	117,434	127,942	180,125
Virginia Coal and Iron Company.....	.....	101,615	31,181
Hampshire and Baltimore.....	91,516	94,589	153,685
Maryland.....	120,543	77,295	261,309
Swanton.....	49,096	67,196	68,559
Franklin.....	45,220	64,012	98,447
George's Creek Mining.....	1,725	61,885	85,481
Potomac.....	63,659	58,326	68,674
Blair Avon.....	33,769	43,288	60,282
Piedmont.....	35,796	36,601	55,342
North Branch.....	.....	7,108	26,490
New Reading.....	.....	1,606	19,399
George's Creek Valley.....	1,125	1,039	.....
Davis mines.....	.....	.....	5,866
Canton.....	1,212	.....	.....
Union Mining Company.....	3,220	.....	.....
Totals.....	1,574,339	1,835,081	2,342,773

## IMPORTS AND EXPORTS.

The tariff from 1824 to 1843, was six cents per bushel, or \$1.63 per ton ; from 1843 to 1846, \$1.75 per ton ; 1846, 30 per cent. advalorem ; 1847 to 1861, 24 per cent. advalorem ; 1862-3-4, \$1.00 per ton ; 1865, \$1.10 ; 1866 to 1872, \$1 25 per ton ; since August 1872, 75 cents per ton. During the period from June, 1854 to March, 1866, the Reciprocity treaty was in force, and coal from the British possessions in North America, was admitted into the United States, duty free. American coal goes into these Provinces, free of duty, at the present time.

The imports of coal into the United States, since 1821, have been :—

Years.	Tons.	Years.	Tons.
1821.....	22,419	1850.....	180,439
1822.....	34,672	1851.....	214,774
1823.....	30,535	1852.....	183,015
1824.....	20,440	1853.....	231,508
1825.....	25,795	1854.....	252,865
1826.....	34,643	1855.....	287,408
1827.....	40,264	1856.....	293,507
1828.....	32,364	1857.....	360,712
1829.....	45,463	1858.....	396,628
1830.....	58,582	1859.....	403,928
1831.....	36,508	1860.....	398,986
1832.....	72,978	1861.....	465,434
1833.....	92,432	1862.....	541,099
1834.....	71,626	1863.....	624,378
1835.....	59,968	1864.....	567,738
1836.....	108,432	1865.....	684,180
1837.....	153,450	1866.....	696,093
1838.....	129,082	1867.....	521,305
1839.....	181,555	1868.....	396,128
1840.....	162,867	1869.....	423,566
1841.....	155,394	1870.....	420,688
1842.....	141,521	1871.....	443,955
1843.....	41,163	1872.....	490,631
1844.....	87,073	1873.....	456,915
1845.....	85,766	1874.....	498,028
1846.....	156,853	1875.....	441,600
1847.....	148,021	1876.....	407,853
1848.....	196,168	1877.....	497,260
1849.....	198,213		

The exports of coal have been as below :—

Years.	Tons.	Years.	Tons.
1870.....	227,918	1874.....	763,402
1871.....	277,951	1875.....	519,345
1872.....	401,078	1876.....	568,076
1873.....	584,633	1877.....	740,456

Years are to June 30—U. S. fiscal year.

Details of the exports for the year 1877, including all kinds of coal, are given below :—

Countries.	Bituminous.	Anthracite.
Brazil.....	115	466
Central America States.....	59	61
Chili.....	1,940	1,021
China.....	.....	2,796
Danish West Indies.....	7,779	.....
France.....	.....	300
French West Indies.....	3,424	175
Miquelon, Langley, etc.....	.....	25
French Possessions, (all other).....	2	...
Nova Scotia, New Brunswick, etc.....	6,207	33,950
Quebec, Ontario, etc.....	223,267	309,272
British Columbia.....	19	.....
Newfoundland and Labrador.....	.....	985
British West Indies.....	1,693	2,093
British East Indies.....	.....	272
Hong-Kong.....	.....	261
British Possessions in Africa.....	.....	241
Hawaiian Islands.....	392	601
Italy.....	16	...
Japan.....	.....	682
Mexico.....	2,941	391
Dutch West Indies.....	.....	202
Peru.....	.....	2,128
Portugal, Azores, Madeira, etc.....	10	340
San Domingo.....	297	484
Spain and Cuba.....	55,168	17,342
Porto Rico.....	.....	347
United States of Columbia.....	19,967	3,320
Venezuela.....	1,543	216
All other countries and ports.....	.....	8
Totals (tons 2,240 lbs.).....	324,839	377,979
Imports and exports :—	1877.	1876.
Imports Bituminous coal.....	498,275	488,132
Exports Bituminous coal.....	324,839	253,387
Exports Anthracite coal.....	377,979	362,044
		361,669

## NOVA SCOTIA.

The Government Inspector of Mines, H. S. Poole, furnishes the following summary of the coal sales of Nova Scotia, since the beginning of the industry in that Province. It is interesting to report an increase for 1877 :—

Years.	Tons.	Years.	Tons.
1785—1790.....	14,349	Total to 1871.....	10,069,143
1791—1800.....	51,048	For 1871.....	596,418
1801—1810.....	70,452	For 1872.....	785,914
1811—1820.....	91,527	For 1873.....	881,106
1821—1830.....	140,820	For 1874.....	749,127
1831—1840.....	839,981	For 1875.....	706,795
1841—1850.....	1,523,798	For 1876.....	634,207
1851—1860.....	2,399,829	For 1877.....	687,065
1861—1870.....	4,927,339		



The duty on coal imported into the United States from any foreign country is seventy-five cents per ton, gold, on the round or coarse coal, and forty cents per ton, on the culm or slack; that is the coal which passes through bars not wider than three-quarters of an inch. About eight per cent. of the coal sold is culm. We give below the duty at various dates :—

1846 to 1862.....	24 per cent. advalorem.
1862-3-4.....	1.00 per ton.
1865.....	1.10 per ton.
1866-1872.....	1.25 per ton.
1872 to date.....	.75 cts. per ton.

Reciprocity Treaty in force from June, 1854 to March, 1866.

Number of tons actually raised during a term of years :—

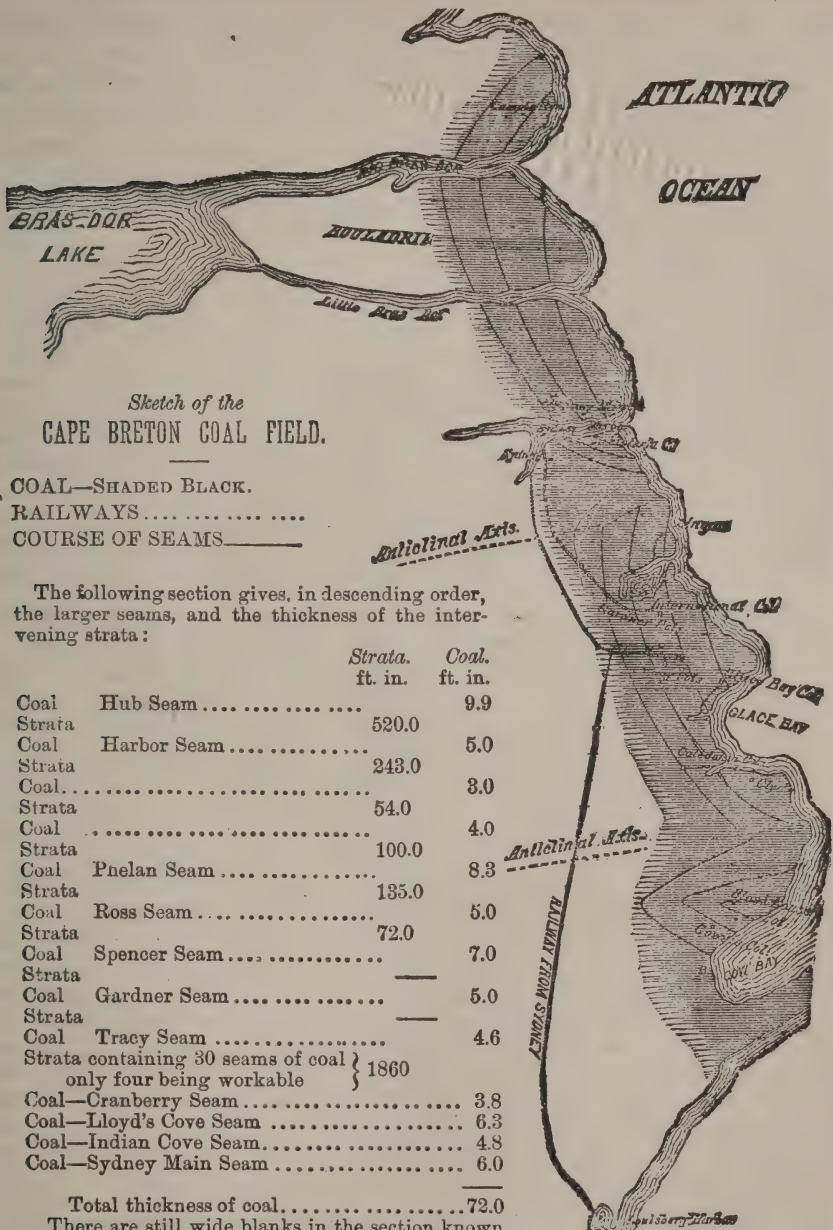
Year.	Tons.	Year.	Tons.
1864.....	562,102	1871.....	673,242
1865.....	715,786	1872.....	880,950
1866.....	664,998	1873.....	1,051,467
1867.....	517,525	1874.....	872,720
1868.....	462,188	1875.....	781,165
1869.....	578,062	1876.....	709,646
1870.....	625,769	1877.....	757,496

Comparing the sales of 1877 with previous years, we obtain the following table :—

County.	1877	1876	1875	1874
Cumberland.....	99,078	84,528	60,944	49,599
Pictou.....	284,155	275,618	337,102	357,926
Cape Breton.....	301,981	268,808	304,702	337,016
Other Counties.....	1,851	5,253	4,047	4,586
Total tons.....	687,065	634,207	706,795	749,127

The destination of the coal sold during the year 1877, together with a comparison of the "markets" for each year is shown below :—

Markets.	1877—Tons.	1876—Tons.	1875—Tons.	1874—Tons.
Nova Scotia.....	255,790	225,658	212,630	214,965
Quebec.....	95,118	117,303	189,754	162,169
New Brunswick.....	104,818	101,890	85,968	78,841
Newfoundland.....	49,342	51,742	62,348	55,696
P. E. Island.....	45,169	46,908	43,641	41,948
United States.....	118,216	71,634	88,746	138,395
West Indies.....	13,660	17,971	16,429	47,844
South America.....	573	.....	4,779	5,077
East Indies.....	.....	.....	1,003	.....
Great Britain.....	4,379	1,101	497	4,152
Total.....	687,065	634,207	706,795	749,127



Production of each colliery for the years 1874, 1875, 1876 and 1877.

DISTRICT.	1877.	1876.	1875.	1874.
	Product.	Product.	Product..	Product.
<b>CUMBERLAND COUNTY.</b>				
Cumberland.....	1,432	5,055	336	—
Lawrence.....	—	—	60	27
Seaman.....	530	—	528	—
Scotia.....	1,213	1,286	1,460	1,741
Joggins.....	10,223	14,296	11,908	16,685
Spring Hill.....	93,606	72,595	50,505	33,137
<b>PICTOU COUNTY.</b>				
Acadia.....	63,101	60,280	65,992	110,734
Albion Deep.....	20,792	136,273	46,948	41,188
Albion Main.....	95,243	—	90,121	94,343
Intercolonial.....	57,827	53,872	72,016	68,069
Whitehall.....	—	—	214	90
Nova Scotia.....	27,001	21,375	60,824	56,953
Vale.....	42,513	34,590	46,547	39,099
<b>CAPE BRETON COUNTY.</b>				
Blockhouse.....	61,938	34,819	23,064	28,897
Caledonia.....	26,197	30,789	16,566	39,388
Collins.....	7,768	7,693	662	—
Emery.....	—	—	8,356	22,137
Gardiner.....	3,540	—	10,400	20,196
Glace Bay.....	36,295	30,022	22,734	46,535
Gowrie.....	28,154	20,275	23,924	32,857
Ingraham.....	10	40	150	67
International.....	18,346	24,111	40,489	36,385
Lingan.....	21,054	15,289	22,805	19,697
Ontario.....	13,391	11,095	5,653	7,070
Reserve.....	—	—	9,493	28,769
Schooner Pond.....	—	—	—	1,523
South Head.....	363	653	1,116	—
Sydney.....	109,098	102,644	124,199	105,487
Victoria.....	14,262	17,672	18,814	15,310
<b>INVERNESS COUNTY.</b>				
Port Hood.....	1,072	2,548	720	35
<b>VICTORIA COUNTY.</b>				
New Campbellton.....	2,527	3,362	4,561	5,961
Total coal raised.....	757,496	709,646	781,165	872,720

The ton weight designated is that of 2,240 pounds, in all cases. The coals raised are used for gas, steam and domestic purposes generally, and find favor where they have been used. It will have been noticed that the most important districts are Pictou and Cape Breton ; the former coal field is said to contain some twenty-eight square miles, while the latter extends along the coast for thirty-five miles, there are many seams of workable coal

that have not yet been developed, and further discoveries are constantly being noticed. We append an analysis of certain of the coals, tested for gas purposes. Albertite, a variety of Asphalt yielding 14,500 cubic feet of 54 candle illuminating power gas to the ton, is found in New Brunswick. Coke is being made from the slack, for use among the iron industries, and this must prove a source of wealth to the Provincial coal owners.

<i>Seam.</i>	<i>Cubic feet per ton.</i>	<i>Candle power.</i>	<i>Chemist.</i>
Victoria.....	9,340	.....	.....
Albion.....	7,180	15	Johnson.
Mc Gregor.....	9,500	13	Manhattan Co.
Blockhouse.....	10,217	17	Manhattan Co.
Phelan.....	9,500	16.5	.....
Emery.....	9,500	.....	Percy.
Hub.....	9,560	13	.....
Hub.....	10,080	16	Harrington.
Harbor.....	9,846	16.7	.....
Harbor.....	10,106	17	Harrington.
Lingan.....	9,900	17	Imperial Gas.
Lingan.....	9,520	13	Chandler.
Sydney (Main).....	9,500	.....	How.
Mc Auley.....	9,000	15	Richard.





## GREAT BRITAIN.

## MINERALS PRODUCED IN GREAT BRITAIN.

MINERALS.	Tons raised in 1874.	Tons raised in 1875.	Tons raised in 1876.
Coal.....	125,043,257	131,867,105	133,344,766
Iron ore.....	14,844,936	15,821,060	16,841,583
Copper ore.....	78,521	71,528	79,252
Tin ore.....	14,039	13,995	13,688
Lead ore.....	76,201	77,746	79,096
Zinc ore.....	16,830	23,978	23,613
Iron pyrites.....	56,208	48,035	48,809
Arsenic.....	6,268	5,061	4,228
Manganese.....	5,778	3,205	2,796
Ochre, Umber, etc.....	7,122	5,315	3,805
Wolfram.....	32	46	23
Fluor spar.....	634	358	337
Barytes.....	14,374	15,549	23,561
Clays—fine and fire, and shale.....	2,436,912	3,450,780	4,581,908
Coprolites.....	149,654	250,122	258,150
Salt.....	2,306,567	2,316,644	2,334,997

## METALS OBTAINED FROM THE ORES ENUMERATED.

	1874—Tons.	1875—Tons.	1876—Tons.
Iron, pig.....	6,991,408	6,365,462	6,555,997
Tin.....	9,942	9,614	8,500
Copper.....	4,981	4,322	4,694
Lead.....	58,777	57,435	58,667
Zinc.....	4,470	6,715	6,641
Silver.....	509,277	487,358	483,422

Absolute total value of the metals and coal, with other minerals which are not smelted, (except building stone, lime, slate, and common clay), produced in the United Kingdom :—

	1874.	1875.	1876.
Value of the metals produced.....	£19,539,070	£18,476,746	£18,668,818
Value of the coal.....	45,849,194	46,163,486	46,670,668
Value of other minerals.....	2,446,049	2,847,456	2,887,367

Total..... £67,834,313    £67,487,688    £68,226,853

The ton weight in all cases is 2,240 lbs.

The amount of coal exported from Great Britain, during the year 1877, was as follows :—

Countries.	Tons.	Countries.	Tons.
Russia.....	1,044,374	Turkey.....	214,216
Sweden and Norway.....	1,195,980	Egypt.....	522,170
Denmark.....	755,818	Brazil.....	340,083
Germany.....	2,029,238	Malta.....	278,338
Holland.....	411,655	British India.....	896,174
France.....	2,082,372	Other Countries.....	2,788,958
Spain and Canaries.....	824,871	Coal, etc. for steamers engaged	
Italy.....	1,065,585	in foreign trade.....	2,661,552
		Grand total.....	19,020,380

The receipts of coal at London, for a series of years, have been as below :—

Year.	By Sea.	By Canal.	By Rail.	Total.
1865.....	3,161,683	8,532	2,733,056	5,903,271
1866.....	3,033,193	10,176	2,969,896	6,013,215
1867.....	3,016,416	9,965	3,295,652	6,322,033
1868.....	2,918,230	9,527	2,979,333	5,907,090
1869.....	2,873,688	6,941	3,341,485	6,212,214
1870.....	2,993,710	7,301	3,758,089	6,759,100
1871.....	2,762,712	6,615	4,449,141	7,218,468
1872.....	3,548,918	8,236	4,999,268	7,556,422
1873.....	2,665,630	11,195	5,147,413	7,824,288
1874.....	2,727,719	5,982	4,689,785	7,423,486
1875.....	3,134,846	4,594	5,065,452	8,204,892
1876.....	3,273,443	4,696	5,173,237	8,451,375
1877.....	3,170,601	4,608	5,426,204	8,501,413

Of the receipts in 1877, some 1,943,258 tons were afterward conveyed beyond the limits, leaving 6,558,155 tons as consumed in the city.

The following will show the exportation of coal since 1854 :—

Year.	Tons.	Year.	Tons.
1854.....	4,390,000	1866.....	9,053,721
1855.....	4,900,000	1867.....	10,415,787
1856.....	5,800,000	1868.....	10,837,804
1857.....	6,600,000	1869.....	10,588,425
1858.....	6,500,000	1870.....	11,495,002
1859.....	7,000,000	1871.....	12,851,957
1860.....	7,400,000	1872.....	13,211,961
1861.....	7,200,000	1873.....	12,712,222
1862.....	7,600,000	1874.....	13,927,205
1863.....	7,500,000	1875.....	14,475,036
1864.....	8,809,908	1876.....	19,930,363
1865.....	9,170,477	1877.....	19,020,380

The mining of the coal produced in 1876, gave employment to 514,532 persons, above and below ground, at 4,002 collieries or pits. 839 accidents occurred in the year, proving fatal to 933 persons. The estimated output for 1877, is set down at 132,000,000 tons. The coal raised in 1876, was used by the several industries named, in the proportions stated below :—

Used for steam-power.....	23.52	per cent.
Domestic consumption.....	17.20	"
In the manufacture of pig iron.....	15.21	"
In the manufacture of merchant iron and steel.....	15.00	"
Exported.....	9.27	"
Consumed in and about coal mines.....	6.25	"
For the manufacture of gas.....	5.87	"
For steam navigation.....	3.00	"
Locomotives and engines on railways.....	1.88	"
Waterworks, breweries, etc.....	1.35	"
Smelting tin, copper, lead, etc.....	0.80	"
Consumed in and about metal mines.....	0.47	"
For use in army department.....	0.18	"

## COAL IN SPAIN.

There are said to be something like 3,501 square miles of coal-producing area in this country; in the provinces of Castile, Leon, and the Asturias. The figures of the production for a term of years, are as below—expressed in tons of ten metric quintals=2,204 lbs.:—

Years.	Tons.	Years.	Tons.
1870.....	414,482	1874.....	600,000
1871.....	500,000	1875.....	560,000
1872.....	570,000	1876.....	500,000
1873.....	589,707	1877.....	550,000

## VANCOUVER'S ISLAND.

This island is located on the western coast of North America, within the limits of the Dominion of Canada. The coal area is estimated at 390 square miles. San Francisco (Cal.) receives a large percentage of the output. The tonnage produced is stated as below:—

Years.	Tons.	Years.	Tons.
1870.....	29,863	1874.....	81,397
1871.....	45,000	1875.....	110,145
1872.....	46,148	1876.....	140,087
1873.....	45,723	1877.....	154,052

Tons are stated at 2,240 lbs.

## AUSTRIA.

In the year 1818, the production of coal in Austria and Hungary was 84,450 tons; in 1828 it was 153,950 tons; in 1838, 299,100 tons; in 1848, 838,000 tons, and in 1858, this had increased to 2,598,800 tons. About one-half of the coal produced is Lignite or Brown coal. We give statistics of the production, for a number of years:—

Years.	Tons.	Years.	Tons.
1860.....	3,128,478	1869.....	6,685,161
1861.....	3,629,662	1870.....	6,443,575
1862.....	4,064,718	1871.....	9,891,350
1863.....	4,083,820	1872.....	10,389,952
1864.....	4,101,698	1873.....	10,500,000
1865.....	3,732,416	1874.....	11,000,000
1866.....	4,369,582	1875.....	10,895,000
1867.....	5,445,391	1876.....	11,500,000
1868.....	6,199,027	1877.....	11,500,000

In tons of 2,240 lbs. (English).

## FRANCE.

The production of coal in France, since 1787, has been as follows (tons of 2,204 pounds, or ten metric quintals):—

Years.	Tons.	Years.	Tons.
1787.....	211,160	1862.....	10,102,116
1802.....	829,105	1867.....	12,148,223
1811.....	759,878	1868.....	13,253,876
1816.....	924,823	1869.....	13,108,662
1821.....	1,114,448	1870.....	6,550,000
1826.....	1,513,482	1871.....	13,400,000
1831.....	1,728,950	1872.....	15,899,005
1836.....	2,789,858	1873.....	17,500,000
1841.....	3,349,303	1874.....	17,059,547
1846.....	4,389,532	1875.....	16,949,031
1852.....	4,816,306	1876.....	17,047,760
1857.....	7,755,987		

France imports from Germany, England and Belgium; the amount from England having been 2,558,678 tons in 1875, 3,250,559 tons in 1876, and 2,082,372 tons in 1877.

We have returns of the product of the department of the Nord, for 1877. It amounted to 3,216,939 tons; the product of the Pas-de-Calais was 3,423,981 tons for the same period.

## BELGIUM.

The coal area of the Kingdom is stated at 510 square miles; as will be seen from the figures given below, the production is quite large, having averaged something like fifteen million tons annually, for some years past. The province of Hainaut furnishes the largest proportion, 10,698,130 tons having been mined there during the year 1875; there is an export trade of about four million of tons to France and Germany, and an import of half a million tons from Great Britain.

Progress of the coal output in Belgium:—

Year	Tons.	Years.	Tons.
1836..	2,056,464	1870.....	13,691,118
1846.....	5,037,403	1871.....	13,733,176
1856.....	8,212,419	1872.....	15,158,948
1866.....	12,774,662	1873.....	15,778,401
1867.....	12,755,822	1874.....	14,669,029
1868.....	12,298,589	1875.....	15,011,311
1869.....	12,926,894	1876.....	15,500,000

The Belgian ton is 1,000 kilogrammes=2,204 lbs. (English.)



## RUSSIA.

The total area of coal fields of this Empire, is estimated to be thirty thousand square miles; the chief sources of supply, are the basin of the lower Don, which amounts to nearly one-half of this area, the coal being what is said to be Anthracite; in the west, the government of Kiev and Kharkoff; further to the north, the great central basins, comprising the governments of Tver, Kalouga, Moscow, Raizan, Tula and Novgorod, extending northward as far as the Dwina. To these items may be added that of the Kharkoff beds of Anthracite, and private coal beds of the districts lying to the east of the Vistula.

We are enabled to give the following statistics of the production. It will be noticed that the coal industry is rapidly developing in this country:—

Years.	Tons.	Years.	Tons.
1870.....	817,008	1874.....	1,343,558
1871.....	829,722	1875.....	1,750,000
1872.....	1,097,832	1876.....	1,750,000
1873.....	1,123,940		

In English tons of 2,240 lbs.

## COAL IN ITALY.

The product of coal in Italy, in 1874, was 2,000 tons of Anthracite, (?) 90,500 tons of Brown coal, and 90,000 tons of Peat coal.

## NEW SOUTH WALES.

One of the most important coal-producing countries of the globe is that portion of Australia, known as New South Wales; the trade has sprung up within a very few years, and the outlook for the trade is most encouraging, as the coal has been found equal to the English steam coal, and adopted by the home government; the approximate area of the coal fields is 24,840 square miles; the production from the opening of the mines up to the year 1874, amounted to 12,387,279 tons. A large shipping trade is done, two-thirds of the output being shipped to points outside of the Colony.

Production has been as below:—

Years.	Tons.	Years.	Tons.
1864.....	549,012	1871.....	898,784
1865.....	585,525	1872.....	1,012,426
1866.....	774,238	1873.....	1,092,862
1867.....	770,012	1874.....	1,304,567
1868.....	954,230	1875.....	1,450,000
1869.....	919,773	1876.....	1,600,000
1870.....	868,564		

All quantities figured at 2,240 lbs. per ton.

## THE GERMAN EMPIRE.

This country, as now consolidated, ranks as the largest producer of coal in Europe. Since 1870, the Empire includes old Prussia, Saxony, Bavaria, and the States of the Zollverien. The product of coal of all kinds in the whole of the German States, amounts to something like nearly fifty million tons annually. The grand total of the output in 1871, when the consolidation of the Empire was completed, was 37,852,464 tons; in 1872, 42,324,466 tons of 2,240 pounds each. We have no returns from the individual States, later than this year, but we may safely put them down for five million tons annually. There is sent out from the Empire some four million tons of coal and coke, while the receipts from surrounding countries are two million tons.

The product in (old) Prussia, for a series of years, is shown below:—

Years.	Tons.	Years.	Tons.
1837.....	1,950,915	1867.....	23,738,327
1857.....	9,841,220	1868.....	25,704,758
1858.....	10,721,323	1869.....	26,774,368
1860.....	12,347,828	1870.....	23,316,238
1861.....	14,138,048	1871.....	32,843,288
1862.....	15,576,278	1872.....	36,973,411
1863.....	16,906,707	1873.....	40,335,741
1864.....	19,408,982	1874.....	40,685,332
1865.....	21,794,705	1875.....	41,759,558
1866.....	21,629,746	1876.....	43,364,968

## COAL IN INDIA.

The coal area of the Indian Empire, is stated at 2,004 square miles; the production is rapidly increasing, until now an annual output of one million tons is recorded. We have the official statement, that in 1875, some 850,000 tons were mined, as against 500,000 tons in the year 1870.

## COAL IN JAPAN.

From its location, this country may play an important part in the coal trade of the world. There are some seventy-nine seams, but only ten are more than three feet thick, and at the same time of good quality, nine others of more than three feet in thickness, of poorer quality, may prove workable if it should only require care in mining to separate much of their slaty matter. Besides these, there are ten beds of coal between two and three feet thick, which may be considered of workable character within the long period of time it will take to exhaust even the better beds. The quality of the coal may be judged from the analysis, of which the following are the extremes, viz:—

TATEIRE COAL.—Moisture, 5.060; carbon, 26.283; hydrogen, 4.124; oxygen and nitrogen, 10.271; sulphur, 1.178; mineral matter, 23.084.

SORACHI COAL No. 1.—Moisture, 2.928; carbon, 77.040; hydrogen, 5.685; oxygen and nitrogen, 11.014; sulphur, 0.542; mineral matter, 2.791.

## COAL PRODUCTION OF THE GLOBE—1870 TO 1876.

*Prepared for this Work, by James Macfarlane, e. Author of "The Coal Regions of America."*

	Square miles of	1870.	1-71.	1872.	1873.	1874.	1875.	1876.
Great Britain.....	11,900	110,431,192	117,352,028	123,497,316	127,016,747	125,067,916	131,867,105	133,344,766
United States.....	192,000	32,863,690	41,000,000	45,000,000	50,512,000	47,872,963	49,694,652	49,005,748
Germany.....	1,770	23,316,238	37,852,463	42,324,466	40,335,741	40,655,332	42,283,097	43,364,968
France.....	2,086	6,550,000	13,400,000	15,899,005	17,500,000	17,059,547	16,949,031	17,047,760
Belgium.....	510	13,697,118	13,733,176	15,158,948	15,778,401	14,669,029	14,743,271	15,500,000
Austria.....	1,800	6,443,575	9,891,350	10,389,952	10,500,000	11,000,000	10,895,000	11,500,000
Russia.....	30,000	817,008	829,722	1,097,832	1,123,940	1,343,558	1,750,000	1,750,000
Spain.....	3,501	414,482	500,000	570,000	589,707	600,000	560,000	500,000
Portugal.....	.....	.....	.....	18,000	18,000	18,000	18,000	18,000
Nova Scotia.....	18,000	625,769	673,242	880,950	1,051,567	872,720	781,165	709,646
Australia.....	24,840	868,564	915,784	1,040,154	1,226,475	1,304,567	1,450,000	1,600,000
India.....	2,004	500,000	500,000	600,000	850,000	850,000	850,000	1,000,000
Japan.....	5,000	.....	.....	84,000	150,000	390,000	325,500	350,000
Vancouver's Island.....	390	29,863	45,000	75,000	75,000	81,397	110,145	140,087
*Other Countries.....	.....	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
.....	.....	197,557,499	247,032,764	258,141,623	267,737,179	262,785,029	272,266,966	276,830,965

\*Italy, New Zealand, Chili, China, etc.

## BUFFALO, N. Y.

The distribution of the coal received here is divided into city trade for family use, rolling mills, furnaces, manufactories and gas works; interior trade for gas works, family use and manufacturing purposes; and all points of the West are supplied principally with Anthracite, which is taken by vessels from this port to Chicago, Milwaukee, Duluth, etc.,

The receipts for a series of years have been as below:—

Year.	BITUMINOUS.			ANTHRACITE.	
	By Lake.	By Canal.	By L. S. & M. S. R. R.	By Canal.	By Rail.
1863.....	71,323	12,551	.....	123,319	.....
1864.....	65,214	35,237	.....	154,214	.....
1865.....	68,141	42,322	.....	143,998	.....
1866.....	68,142	62,172	.....	248,716	.....
1867.....	101,107	67,124	.....	223,718	.....
1868.....	91,457	73,596	.....	318,353	.....
1869.....	99,460	108,972	.....	112,914	187,000
1870.....	94,796	163,437	.....	177,027	250,000
1871.....	88,511	80,660	76,063	102,185	300,000
1872.....	78,879	95,500	109,397	190,994	330,000
1873.....	87,724	125,000	190,000	255,044	479,885
1874.....	67,467	70,000	140,000	252,262	320,000
1875.....	32,767	45,000	350,000	250,206	500,000
1876.....	21,418	30,000	297,842	151,175	350,000
1877.....	44,247	10,000	214,200	209,609	550,000

The shipments of Bituminous eastward by canal from Buffalo were as below:—

Year.	Tons.	Year.	Tons.
1863.....	20,125	1870.....	65,300
1864.....	30,043	1871.....	60,522
1865.....	28,283	1872.....	53,198
1866.....	50,202	1873.....	68,210
1867.....	57,495	1874.....	46,995
1868.....	59,766	1875.....	23,100
1869.....	62,690	1876.....	19,153
1877.....	.....	.....	29,250

There was 80,000 tons of Blossburg semi-Bituminous received *by rail*, in 1873, 50,000 tons in 1874, 75,000 tons in 1875, 25,000 tons in 1876, and 50,000 tons in 1877.

There was 10,000 tons Blossburg received *by canal*, in 1877, against 30,000 in 1876, and 45,000 in 1875.

The amount of Anthracite that was shipped westward, via the lakes, was 510,443 tons in 1873, 344,500 in 1874, 339,722 in 1875, 321,455 in 1876, and 405,074 in 1877. There were 60,000 tons of Blossburg semi-Bituminous shipped West via the lakes in 1873, 40,000 in 1874, 50,000 in 1875, 40,000 in 1876, and 50,000 in 1877.

Freights ranged from twenty-five cents in August and September, to one dollar per ton in November, to Chicago, Ill.

The ton weight in use here is 2,000 lbs.



## SAN FRANCISCO, CAL.

The statements given below will serve to indicate the increased consumption of the several varieties of coal, at San Francisco. The principal sources of supply are, from Mt. Diablo, in the immediate vicinity, from Coos Bay and Bellingham Bay in Oregon, and Seattle in Washington Territories, from Vancouver Island, from Australia and Great Britain, as also Cumberland and Anthracite, from the Atlantic Coast; coal has also been received in small quantities from Chili, Sitka, Alaska and Japan, while the domestic sources of supply are constantly on the increase as the schedules show :—

Years.	Total Receipts.	Years.	Total Receipts.
1860.....	77,635	1869.....	328,973
1861.....	116,245	1870.....	320,493
1862.....	120,545	1871.....	315,194
1863.....	135,550	1872.....	434,467
1864.....	167,298	1873.....	454,582
1865.....	150,147	1874.....	531,947
1866.....	192,601	1875.....	538,209
1867.....	248,925	1876.....	648,388
1868.....	282,025	1877.....	576,760

Details of business for the years 1876 and 1877 are as below :—

		Tons.—1876.	Tons.—1877.
<b>FOREIGN.</b>	Australian.....	131,695	100,513
	English.....	121,948	89,362
	Vancouver Island.....	100,965	102,421
	Chili.....	3,150	8,145
<b>DOMESTIC.</b>	Mount Diablo.....	108,078	96,172
	Coos Bay.....	41,286	30,941
	Bellingham Bay.....	21,335	10,475
	Seattle.....	95,314	102,333
	Rocky Mountain.....	226	133
	Ione, California.....		3,458
	Ounalaska.....		190
	Buckeye.....		41
<b>EASTERN.</b>	Carbondale, California.....		177
	Cumberland.....	12,520	21,791
	Anthracite.....	11,871	10,608

Making the total of.....	648,388	576,760
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The ton weight is that of 2,240 lbs.

Tonnage of foreign coals on the way to San Francisco, December 31, 1877,— 29,000 tons, as against 60,000 tons the year previous. Coal ruled very low during 1877. Coast supplies are taking the place of every foreign or Atlantic coast variety of coal.

## NEW ORLEANS, LA.

The coal brought to this market is almost exclusively Pittsburgh coal. The flats and barges are towed by powerful towboats built expressly for that purpose. The towing between Pittsburgh and Louisville depends on the state of the river. When the stage of water is too low for navigation, which it frequently is for weeks, and even months, the supplies at the lower points become deficient and prices naturally advance, often reaching very high prices. The coal flats and barges sent to New Orleans are generally dropped at Willow Grove, near Greenville, just above the city, where they are superintended for the owners or agents. When a boat or barge is wanted, a small city tugboat is sent to tow it to the city, or to its destination on the coast.

The largest amount of coal consumed during the past six years, was 301,555 tons in 1869, and the least, 211,727 tons in 1875.

Messrs. C. A. Miltenberger & Co., give the following as the consumption of Pittsburgh coal at this port:—

Year.	Bbls.	Year.	Bbls.
1869.....	3,317,000	1874.....	2,749,500
1870.....	3,203,500	1875.....	2,448,000
1871.....	3,112,000	1876.....	2,802,700
1872.....	2,991,500	1877.....	3,014,200
1873.....	2,821,500		

In addition to the figures for 1876, add some 84,000 barrels of St. Bernard coal, from Kentucky, and for 1877, 56,000 barrels. Boats average 9,000 barrels; barges, 4,500 barrels; French Creeks, 3,400 barrels. It is estimated that eleven barrels make a ton of 2,000 pounds. The distance from Pittsburgh to New Orleans is some 2,000 miles, and the rate of freight is about three and one-half cents per bushel.

The wholesale price ranged from thirty to fifty cents per barrel, of two and one-half bushels. A small amount of Anthracite is received here, and sells for \$7.00 @ \$8.00 per net ton at wholesale.

## PROVIDENCE, R. I.

Receipts of coal at this point have been:—

	Tons.	Tons.
1871..... Domestic,	504,006	Foreign, 13,900
1872.....	623,842	“ 9,454
1873.....	634,112	“ 3,232
1874.....	532,564	“ 6,604
1875.....	602,847	“ 663
1876.....	610,339	“ ....
1877.....	636,480	“ 8,821

All tons are of 2,240 lbs.

## BOSTON, MASS.

The receipts are shown below :—

From	Tons.—1875.	Tons.—1876.	Tons.—1877.
Alexandria, Virginia.....	97,697	49,643	77,956
Georgetown, District of Columbia.....	20,567	12,945	10,150
Philadelphia, Pennsylvania.....	623,245	639,643	696,837
Baltimore, Maryland.....	168,798	151,118	157,553
* Other places (New York, etc.).....	290,271	294,221	272,781
† Great Britain.....	2,738	6,177	22,952
† Nova Scotia... ..	29,706	26,451	41,822
Total.....	1,233,022	1,180,204	1,280,051

The receipts of foreign and domestic coal at this port have been :—

Years.	Foreign.	Domestic.	Years.	Foreign.	Domestic.
1877.....	64,774	1,215,277	1869.....	110,466	764,017
1876.....	32,628	1,147,576	1868.....	103,901	742,481
1875.....	32,444	1,200,578	1867... ..	117,440	680,221
1874.....	51,438	1,125,516	1866.....	159,380	676,376
1873.....	87,700	1,076,673	1865.....	209,225	538,917
1872.....	90,739	1,068,781	1864.....	188,786	516,665
1871.....	109,013	822,808	1863.....	180,445	589,921
1870.....	115,022	819,890			

These figures include all the coal arriving at this port for the home trade, and for the points reached by railroads centering here.

The following are the highest and lowest prices for Anthracite and Provincial coal, for the years named, as per statistics of the *Commercial List*:—

Years.	Anthracite.		Nova Scotia.	
1877.....	\$4.50@ \$7.00		\$4.25@ \$5.00	
1876.....	6.00	8.25	4.75	6.00
1875.....	7.00	9.00	5.25	6.25
1874.....	7.00	9.00	5.75	7.75
1873.....	8.00	10.00	7.00	9.00
1872.....	7.00	10.00	6.00	8.50
1871.....	7.00	10.00	5.75	7.00

\* There is included in this item, for 1877, some 88,112 tons of Virginia coal, chiefly for gas purposes.

† This coal is mainly for gas-making.

## CINCINNATI, OHIO.

The coal received at this city includes Youghiogheny, from the neighborhood of Pittsburgh, Pa., the Pomeroy from the vicinity of Pomeroy, Ohio; Hocking Valley, Ohio; Muskingum, Ohio; Ohio river; the Kanawha from West Virginia, including the Splint, Bituminous and Cannel, and the Anthracite from Pennsylvania.

Of Anthracite coal, the quantity consumed in this city is increasing, owing to the reduced price. A large commission business is done here in this variety, for interior points, shipped direct, and which does not appear in the statistics.

The shipments of coal from this city to interior towns have increased until they amount to 5,138,700 bushels in 1876-77, against 5,096,100 in 1875-6.

The following table will show the number of bushels of coal of all kinds, received at Cincinnati, for the years named:—

Years.	Bushels.	Years.	Bushels.
1853-54.....	8,158,000	1865-66.....	18,022,990
1854-55.....	10,356,000	1866-67.....	18,446,226
1855-56.....	7,500,000	1867-68.....	17,500,000
1856-57.....	14,500,000	1868-69.....	25,500,000
1857-58.....	15,000,000	1869-70.....	30,300,000
1858-59.....	12,392,701	1870-71.....	22,972,000
1859-60.....	14,600,000	1871-72.....	30,790,796
1860-61.....	12,500,000	1872-73.....	37,274,497
1861-62.....	8,500,000	1873-74.....	35,234,834
1862-63.....	8,000,000	1874-75.....	35,360,300
1863-64.....	15,975,366	1875-76.....	40,183,317
1864-65.....	16,467,023	1876-77.....	39,622,634

It is safe to calculate the bushel at eighty pounds, which would give twenty-eight to the ton of 2,240 lbs.

## DETAILS FOR THE SEASON 1876-77.

Bushels.

Pittsburgh or Youghiogheny, by river.....	28,237,572
Ohio River.....	5,141,150
Kanawha River.....	3,631,823
Muskingum Valley, by rail.....	172,040
Hocking Valley, by rail.....	1,218,918
Kentucky Cannel.....	322,171
Anthracite, by rail.....	376,125
Hocking and Muskingum coal, not elsewhere included.....	522,835

Total for the season..... 39,622,634

The consumption of coke is increasing. Cannel is not so much used as formerly. Pittsburgh coal afloat averaged eight cents per bushel. We append the following as showing the growth of the Anthracite trade:—

1872-73.....	75,000 bushels.	1874-75.....	248,750 bushels.
1873-74.....	112,000 bushels.	1875-76.....	282,578 bushels.



## CHICAGO, ILL.

This city is in direct rail and water communication with the Anthracite coal mines, and is therefore freely supplied at low rates, and the startling result is shown, that although the railway system connecting this city with many of the Western Bituminous coal fields is so thoroughly complete, the amount of Anthracite now received, is one-fourth of the sum total.

Chicago is one of the most important markets in the country for soft coal, for local manufacturing and other purposes, and the distributing point for a large section of the Northwest; the Anthracite forming the bulk of the coal thus forwarded. The shipments from the city foot up 271,176 tons for the year 1877.

The receipts for the years 1875, 1876 and 1877 are shown below :—

Received by	Tons—1875.	Tons—1876.	Tons—1877.
Lake.....	748,706	711,572	804,759
Illinois and Michigan canal.....	7,778	5,292	8,828
Chicago and Northwestern railroad.....	5,564	.....	2,949
Illinois Central railroad.....	38,288	16,348	28,274
Chicago, Rock Island and Pacific railroad.....	31,893	22,703	35,876
Chicago, Burlington and Quincy railroad.....	5,821	10,986	49,923
Chicago and Alton railroad.....	278,006	293,807	283,213
Chicago and Eastern Illinois railroad.....	205,530	196,865	178,146
Lake Shore and Michigan Southern.....	773	55,205	78,978
Pittsburgh, Ft. Wayne and Chicago railroad.....	112,609	142,691	102,241
Pittsburgh, Cincinnati and St. Louis railroad.....	150,349	106,774	105,012
Baltimore and Ohio railroad.....	57,900	17,804	22,236
Michigan Central railroad.....	3,266	38,774	48,574
Totals.....	1,641,488	1,619,033	1,749,091

The ton weight designated in these tables is that of 2,000 pounds.

## RECEIPTS BY LAKE.

Years.	ANTHRACITE.	Tons.	Years.	BITUMINOUS.	Tons.
1870.....	340,730	1870.....	181,850		
1872.....	495,765	1872.....	90,820		
1873.....	538,837	1873.....	199,107		
1874.....	395,680	1874.....	261,790		
1875.....	518,971	1875.....	272,831		
1876.....	362,373	1876.....	334,055		
1877.....	442,325	1877.....	360,158		

## TOTAL RECEIPTS AT THE CITY OF CHICAGO.

Years.	Tons.	Years.	Tons.	Years.	Tons.
1852.....	46,233	1861.....	184,089	1870.....	887,474
1853.....	38,548	1862.....	218,423	1871.....	1,081,472
1854.....	56,774	1863.....	284,196	1872.....	1,398,024
1855.....	109,576	1864.....	323,275	1873.....	1,668,257
1856.....	93,020	1865.....	344,854	1874.....	1,359,496
1857.....	171,379	1866.....	496,193	1875.....	1,641,488
1858.....	87,290	1867.....	546,208	1876.....	1,619,033
1859.....	131,204	1868.....	658,243	1877.....	1,749,091
1860.....	131,081	1869.....	799,000		

## ST. LOUIS, MO.

By far the largest proportion of the Bituminous coal received at this city is from the Belleville district, in St. Clair county, Illinois. The principal seam worked is five to seven feet in thickness, and is economically mined. Analysis of this coal shows, water, 6; volatile matter, 38.8; fixed carbon, 52.2; ash, 5. The Iron Mountain railroad brings the semi-Anthracite coal, known as the "Spadra," from Arkansas, to this city.

The following statement shows the receipts of coal at St. Louis, for the year 1877, with a comparison from 1872:—

By Ohio and Mississippi railroad.....	3,007,925 bushels.
By Indiana and St. Louis railroad.....	305,275 bushels.
By St. Louis and Iron Mountain railroad.....	13,075 bushels.
By St. Louis, Vandalia and T. H. railroad.....	6,559,700 bushels.
By Belleville and Southern railroad.....	7,676,475 bushels.
By Toledo, Wabash and Western railroad.....	1,400,300 bushels.
By St. Louis and Southeastern railroad.....	4,867,125 bushels.
By Illinois and St. Louis railroad.....	6,412,425 bushels.
By Cairo and St. Louis railroad.....	1,444,875 bushels.
From Ohio river.....	2,621,050 bushels.
From Grand Tower.....	548,625 bushels.
From St. Louis county—estimated.....	1,000,000 bushels.

Total.....35,856,850 bushels.

Twenty-five bushels of eighty pounds each, to the ton of 2,000 lbs.

Total for the year 1876..... 32,073,125 bushels.

Total for the year 1875..... 32,466,650 bushels.

Total for the year 1874..... 29,823,050 bushels.

Total for the year 1873..... 32,608,795 bushels.

Total for the year 1872..... 24,557,425 bushels.

## HAVANA, CUBA.

The receipts of coal at this port, have been as below:—

Years.	Tons.	Years.	Tons.
1868.....	119,087	1873.....	267,168
1869.....	161,470	1874.....	176,587
1870.....	145,366	1875.....	115,092
1871.....	89,340	1876.....	99,971
1872.....	128,187	1877.....	155,123

American (Nova Scotia and U. S.), in 1877, 81,741 tons; English, 73,379 tons.

## RICHMOND, VA.

This city is assuming considerable importance through the efforts of the Chesapeake and Ohio railroad, to build up a trade for the coal of the shippers along their line at the East; if the railway company were in a position to make lower rates of tolls, an increased business might be done, as the Steam, Gas, and Splint coals, produced upon property located upon and near to this route, are of the best quality. They stand unrivalled for all the various purposes for which fuel is required. We append statistics of the total coal business of the Chesapeake and Ohio railroad:—

Quality.	Tons—1875.	Tons—1876.	Tons—1877.
Cannel.....	89,795	52,980	42,000
Splint and Bituminous.....	176,650	194,660	245,995
Coke.....	25,580	28,535	36,070
<b>Totals.....</b>	<b>242,025</b>	<b>276,175</b>	<b>324,065</b>
Shipments of coal to Eastern cities were.....	90,715	112,690	124,980

The business would have been larger during the past season, but that two months in the best part were lost by strikes. In this connection, the following statement of coal receipts at the Richmond market, for the city consumption, taken from official returns, will not be without interest:—

Character of coal.	1873.	1874.	1875.	1876.	1877.
Chesapeake and Ohio.....	* 4,460	8,524	21,556	29,285	50,656
Anthracite and Cumberland.....	64,916	53,545	46,193	40,983	46,875
Chesterfield, etc., etc.....	68,319	57,869	55,844	39,868	36,010
<b>Totals.....</b>	<b>137,695</b>	<b>124,938</b>	<b>123,593</b>	<b>†110,136</b>	<b>133,541</b>

\*Chesapeake and Ohio road only running for seven months. †Powhatan Iron Furnace suspended.

## MOBILE, ALA.

Total receipts for year 1872.....	9,920 tons of 2,240 lbs.
Total receipts for year 1873.....	9,325 tons of 2,240 lbs.
Total receipts for year 1874.....	6,984 tons of 2,240 lbs.
Total receipts for year 1875.....	5,977 tons of 2,240 lbs.
Total receipts for year 1876.....	4,999 tons of 2,240 lbs.
Total receipts for year 1877.....	9,535 tons of 2,240 lbs.

The above are for years ending with September 30. We are informed that for the calendar year 1877, some 1,038 tons Alabama coal was received, and 7,297 tons Pennsylvania and English. The principal use of Pennsylvania coal is for gas. The improvement of the navigable streams that flow through the coal fields to the Gulf of Mexico, would allow a large business to be done from this port, in the coals that are so abundant in the State of Alabama. There has been considerable done in this direction during the past year, and the outlook for an increased use of this coal is flattering.

## BALTIMORE, MD.

At this city an extensive business in coal, both Anthracite and Bituminous, is done. Locust Point, the terminus of the Baltimore and Ohio Railroad, on the environs of this fine city, is the shipping point for the Bituminous coal from the Cumberland region of Maryland, the Gas coal regions of West Virginia, the Somerset county mines and the Youghiogheny Gas coal of Pennsylvania.

The highest price at which the Cumberland coal has been sold at Baltimore, was in March, 1865, when the price was \$14.00 per ton; it rapidly declined, until, in December of the same year, the price was but \$7.40 per ton. The trade in Anthracite at present is entirely local, none being shipped from Baltimore to other and more distant points.

There was some 450,000 tons of Anthracite received last year at Baltimore, by the following routes: By Northern Central Railway from Millersburg, Pa., 112 miles, the Lykens Valley Red Ash. By the same route from Sunbury, Pa., 138 miles, the White Ash. By Susquehanna tide-water canal. Schuylkill from Philadelphia, via river and canal. Little or no Lehigh coal reaches Baltimore. All the sales are 2,240 pounds to the ton. Anthracite sold as high as \$13.50 per ton for lump coal, in May, 1865.

The shipments of Bituminous coal, foreign, were as below:—

Year.	Tons.	Year.	Tons.
1871.....	20,207	1875.....	33,460
1872.....	54,363	1876.....	27,336
1873.....	59,546	1877.....	27,189
1874.....	70,675		

The Northern Central railroad carried the following Anthracite:—

Year.	Tons.	Year.	Tons.
1872.....	244,757	1875.....	276,784
1873.....	242,754	1876.....	263,954
1874.....	232,938	1877.....	343,936

The Pennsylvania railroad began to carry the Bituminous coal from the Clearfield region of Pennsylvania, to Baltimore, in 1875, by its Northern Central line, (to Canton), and there has been considerable local and shipping business for this quality of coal, developed in this vicinity.

During last year a large tonnage was recorded in the Youghiogheny gas coals, received over the Connellsville branch of the Baltimore and Ohio road, under arrangement with the Pennsylvania railroad. As a necessary result of this, the amount of Clarksburg and Fairmount (W. Va.) gas coal received for shipment, was materially lessened, even from what it had been of late years, through this discriminating policy of the Baltimore and Ohio railway.



The following schedule shows the business of the Baltimore and Ohio Railroad Company, giving the disposition of the coal that paid freight (coal for the use of the company not included.):—

Fiscal Years.	Received at Locust Point.	To Baltimore more.	Line Trade.
1862.....	150,987	8,740	978
1863.....	277,505	26,106	3,936
1864.....	302,277	56,181	1,103
1865.....	353,434	49,396	5,340
1866.....	620,888	77,856	20,967
1867.....	629,946	58,377	7,615
1868.....	696,465	39,766	29,780
1869.....	1,187,366	136,704	33,910
1870.....	1,069,390	113,929	36,319
1871.....	1,438,816	113,286	39,500
1872.....	1,482,240	60,630	118,389
1873.....	1,866,829	65,694	147,195
1874.....	1,407,377	.....	.....
1875.....	1,375,297	54,124	90,468
1876.....	1,068,754	47,059	71,476
1877.....	995,132	.....	74,294

During the last year, the coal business of the B. & O. Co., on main stem, was 1,440,165 tons, (including 370,839 tons for the company's use.) On the Pittsburgh division, 1,138,103 tons, and on the Trans-Ohio divisions, 293,403 tons, making the grand total of 2,871,771 tons. The year of the company ends September 30.

The gross rates of transportation, on coal for shipment at Locust Point, over the Baltimore and Ohio railroad, made at the opening of this year's business, were as below:—

Cumberland to Locust Point.....	\$1.37
Piedmont to Locust Point.....	1.65
Newburg to Locust Point.....	3.82
Clarksburg and Fairmont to Locust Point.....	4.32

Per 2,000 pounds—Drawback off Gas Coal shipped North and East.

See pages 26 and 27 for prices of Cumberland, at this point, for a series of years.

The ore and coal business at the harbor of Ashtabula, Ohio, for the year 1877, foots up as follows:—Ore received by the Ashtabula, Youngstown and Pittsburgh Railroad Company, 197,000 tons; ore received by Andrews & Hitchcock, on Lake Shore docks, 16,000 tons; total receipts of ore, 213,000 tons. Coal and coke shipped by the Ashtabula, Youngstown and Pittsburgh railroad, 50,000 tons; coal shipped by Andrews & Hitchcock, 26,000 tons; coal received and shipped by Strong, Manning & Rice, 5,027 tons; total shipment of coal and coke, 81,027 tons.

## PITTSBURGH, PA.

Situated as it is, in the midst of a coal-producing country, and having so many connections by rail and water, with coal and iron deposits, this city has taken a high position among the industrial centres of the United States.

The amount of business that is done here in the course of the year, is most difficult to ascertain, as the railway companies do not separate their tonnage. It is safe to estimate the sum total from the immediate vicinity, at 4,500,000 tons. This is mainly forwarded to points, North, South, East and West, by rail and water. We have the following statistics of what may be called directly tributary connections:—

Route.	Tons—1875.	Tons—1876.	Tons—1877.
Saw Mill Run railroad.....	90,049	148,654	119,251
P. V. & C. railroad.....	43,890	68,796	74,886
P. & Castle Shannon railroad.....	97,313	94,741	78,551
Allegheny Valley railroad.....	271,725	190,821	206,749
Coal by slackwater.....	2,046,967	2,798,333	2,762,706
Coke by slackwater.....	38,308	203,166	135,562

For the *business* of certain roads running through adjacent coal fields, the reader is referred to pages 82 and 84. See for instance, the business done in Connellsville coke, by the Pennsylvania and Connellsville road. In regard to this important industry, we learn that it weighs eighty pounds to the bushel, and when properly coked, one hundred bushels of coal produce one hundred and twenty-five bushels of coke, and the coke weighs forty pounds to the bushel: that is, a given quantity of coal gains one-quarter in bulk, and loses three-eighths of its weight, or one hundred pounds of coal, makes sixty-two and one-half pounds of coke. The coke has become very celebrated throughout the Western States, where it is extensively used for foundry purposes in melting pig iron, selling in competition with Lehigh coal. It is used in blast furnaces for smelting iron from the ore, and is sometimes mixed with the Western coals. It is an excellent fuel for locomotive use. Its freedom from sulphur has given this coke the reputation of being the best known, and it is referred to as the standard.

An analysis made by J. B. Britton, of a sample of Connellsville coke, average of forty-nine pieces, shows:—

Moisture.....	.490	Sulphur.....	.693
Ash.....	11.332	Phosphoric Acid.....	.029
Carbon.....	87.456		

The ash of the coke contained 47. per cent. of silica, and 47. per cent. of alumina.

## CLEVELAND, OHIO.

This city receives a fine and varied assortment of Bituminous coal. A great many coal basins—in fact, nearly all the Ohio formation, as well as most of the coals lying west of the Allegheny mountains, in Pennsylvania—here find a market and a distributing point for the West, Northwest, Eastern, and Canada trade. The great number of vessels employed in the iron-ore and lumber trade, naturally seek coal as a back freight for ballast, which enables Cleveland to place coal in distant ports, like Chicago, Milwaukee and on Lake Superior, at merely nominal rates. The business has been developed within the last fifteen years, and taking the rapid growth of the manufacturing interest in the West, into consideration, it is safe to presume that the trade has not yet reached its ultimate proportions.

The total receipts of coal at Cleveland, from 1828 to 1852, amounted to 662,862 tons; having increased from thirty tons in 1828, to 137,926 tons in 1852; the coal being mined in the districts named below:—

Years.	District.	Tons for the Year.
1828.	Tallmadge.....	30
1829.	Tallmadge.....	708
1830.	Tallmadge.....	1,178
1840.	Tallmadge, New Castle, Trenton.....	6,028
1850.	Tallmadge, Clinton, New Castle, Youngstown, Cuyahoga Falls, Girard and Rochester	83,850
1851.	Tallmadge, Clinton, New Castle, Youngstown, Cuyahoga Falls, Girard and Rochester	107,135
1852.	Tallmadge, Clinton, New Castle, Youngstown, Cuyahoga Falls, Girard and Rochester	137,926

The canal from Akron was opened July 4, 1828, and during that year the thirty tons of coal sent to Cleveland was received by this route. The coal was taken from the mines to the canal with teams, to be shipped, and the business was continued in this way until 1832, when the canal reached the coal fields near Massillon, which were on its banks. The receipts by this route represent the consumption of coal at Cleveland up to 1838. It was not until after this, when the Briar Hill coal began to be received, in 1843, that lake steamers used coal from this place. Since 1845, its use has supplanted that of wood on the steamers of the lower lakes. Until 1845 the entire trade of the lakes in Bituminous coal, was in the hands of Cleveland dealers. About this time, possibly a year or two earlier, Erie began to ship coal, the joint receipts from the interior, at the two places, being only 45,136 tons. The following will serve to show the growth of the trade:—

Years.	Tons.	Years.	Tons.
1865.....	465,550	1872.....	1,348,160
1866.....	583,407	1873.....	1,599,212
1867.....	668,026	1874.....	1,215,353
1868.....	759,104	1875.....	1,414,124
1869.....	922,757	1876.....	1,250,531
1870.....	904,600	1877.....	1,363,345
1871.....	1,165,940		

The ton designated is that of 2,000 lbs. The shipments from this point, by lake, have been:—

	1875.	1876.	1877.
To ports in British Provinces.....	140,637	156,857	80,243
To domestic ports.....	529,211	362,834	276,666



## COLORADO.

The area of land known to be rich in lignite coal deposits in Colorado, is about 7,200 square miles, lying in various parts of the Territory, on both sides of the main range. There can hardly be a doubt but that this extent will be largely increased in years to come, for new discoveries are constantly being made upon the foot-hills and plains.

Separated under heads depending more upon their geographical position than upon the character of the fuel, we find:

- |                              |                                 |
|------------------------------|---------------------------------|
| 1. The Northern mines.       | 2. The Eastern foot-hill mines. |
| 3. The Southern mines.       | 4. The Summit county mines.     |
| 5. The Conejos county mines. |                                 |

Of the first but little is known. Weld and Larrimer counties are undoubtedly underlain by veins of lignite similar to those of Wyoming, which are at present furnishing an excellent fuel for steam engines, domestic purposes, and for some metallurgical processes. Coke made from the product of the Wyoming coal fields has been tried at both Golden and Denver for smelting silver and gold ores, and though discarded in favor of Pennsylvania coke, is considered to be a fair fuel.

The eastern foot-hill mines embrace outcroppings in Boulder and Jefferson counties, nearly all of which have been known since the early days. They are producing at present three-fifths of all the coal mined in Colorado, which is about 120,000 tons, being located nearer the centre of population than any of the other fields.

The main workings lie mostly upon the north side of Ralston Creek, which has cut through the bed and exposed its outcroppings very markedly on either side. Nearly 2,000 feet of the vein is opened. The coal is a very good sample of the product of all the foot-hill mines. It is an altered lignite that burns freely, and crumbles quickly on exposure to the rain or moist air; burns well under the boiler and in the grate, and answers excellently for nearly all the uses to which mineral fuel is put.

The following is an analysis made in 1871 by E. W. Rollins, of the Massachusetts Institute of Technology, Boston.

Hydrogen.....	4.00 per cent.
Carbon.....	66.50 per cent.
Ash.....	7.05 per cent.
Oxygen, Nitrogen and Sulphur.....	22.45 per cent.
	100.00

East of Denver, along the line of the Kansas Pacific, indications of coal are not wanting. The same formation that is found along the foot-hills, tilted up in a nearly vertical position, underlies the whole of eastern



Colorado, which is one vast lignite basin, containing stores of this truly precious mineral.

The southern mines embrace those of Trinidad and Fremont county, and furnish a class of mineral entirely different from any yet found in the Territory. The latter are the oldest mines and the best known, and the demand for it is great, not only for household use, but for the manufacture of gas in Denver.

The Summit county mines are not worked, as they have only lately been brought into notice. They are located on the divide between the Bear and White Rivers, and consist of several seams varying from five to fifteen feet in thickness, which owing to the contorted strata, lie in a variety of positions, from a strict horizontal to a perfect perpendicular. Above is a stratum of sandstone varying from one to three hundred feet in thickness. The coal is of two kinds, one a hard lignite and the other similar to what is called albertite.

The Conejos beds are also new discoveries of which but little is known. Sufficient outcroppings of coal, however, have been noticed below, and west of Las Animas or Elbert, to indicate the existence of extensive lignite deposits there. The mines are hardly opened yet, but situated as they are, not more than thirty miles south of the centre of the San Juan gold and silver district, it will be but a short time before their product will be called for, should they prove at all suitable for metallurgical purposes.

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## INDIANA.

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The area of the Indiana coal measures approximates one fifth of the entire State, and embraces the counties of Perry, Spencer, Warwick, Posey, Vanderberg, Gibson, Pike, Dubois, Daviess, Knox, Martin, Sullivan, Greene, Clay, Vigo, Parke, Vermillion and Fountain. The most important coals, from a manufacturing point of view, are those known as the "lower block" 3.8 thick, the "main block" 4.4 thick, and "upper block" 1.10 thick. Block coal has a laminated structure, and is composed of alternate thin layers of vitreous dull black coal and fibrous mineral charcoal. It splits readily into sheets, breaking with difficulty in the opposite direction; on burning, it scarcely swells, or changes form, and never cakes or runs together. What the celebrated English chemist, Mushet, said about a certain Welsh coal, is equally applicable to the block coal of Indiana. To the purity of Splint coal it unites all the softness and combustibility of wood, and the effects produced by it in the blast furnace, either as to the quality or quantity of

iron, far exceed everything in the manufacture of that metal with charcoal. From careful assays, it is ascertained that this coal gives from 56 to 62 per cent. of fixed carbon, a small amount of water and a small amount of ash. Dr. E. T. Cox., the State geologist, gives this coal an exceptional character as an iron smelting fuel, and reports a ton of pig iron as being made with 4,250 pounds of block coal.

The coal in Clay County is favorably known as an iron-smelting fuel, and we append a description of its qualities. "There are two veins of coal, the upper vein averaging about three feet ten inches in thickness, and the lower one averaging about four feet. The roof is principally sand rock, slate, and slate and sand rock mixed. Fire and potters' clay of good quality underlie the coal. The average depth to the first vein is about forty-five feet from the surface, and the second or lower vein is found at an average depth of seventy-five to eighty feet. The coal is free from slate and sulphur. It burns freely, and leaves a soft, fine white ash, similar to wood ash, and no clinkers." For domestic and steam purposes, the coal is largely used in Chicago, Ill; Indianapolis, Ind; Kalamazoo, Mich.; and the towns and stations along the lines of most of the railroads leading from this coal district, among which may be mentioned the St. Louis, Vandalia, Terre Haute and Indianapolis Railroad; the Jeffersonville, Madison and Indianapolis Railroad; the Indianapolis and St. Louis Railroad; the Louisville, New Albany and Chicago Railroad; the Cincinnati, Lafayette and Chicago Railroad; the Lake Shore and Michigan Southern Railroad; the Indianapolis, Decatur and Springfield Railroad; and the Michigan Central Railroad.

In the block coal zone of the Indiana coal fields there are as many as eight seams of non-caking coal, four of which are of good workable thickness over a portion of the field. These are I, G, F and A, which together, have a maximum thickness of fifteen feet; and by including the other four seams, we have six feet more, making a total of twenty-one feet of block coal.

The coal of Parke County is favorably reported on for the manufacture of iron. It is a block coal, averaging five feet in thickness, weighing seventy-seven pounds to the cubic foot, and gives by analysis 62.5 fixed carbon, 31.00 volatile matter, 4.05 water, and 2 per cent. of ash. The estimated area is about 300 square miles of workable coal.

The "upper block" at Washington, in Daviess County, is extensively mined, and meets with a ready market at St. Louis, and all the towns on the Ohio and Mississippi Railroad. Its specific gravity is 1.294; a cubic foot weighs 80.87 pounds; by analysis it yields: fixed carbon, 60.00; ash, 4.50; volatile matter, 35.50. The coal worked is known as L, a five foot

seam of Bituminous, an excellent caking coal, free from impurities, and may be handled and stocked without much loss; it has been used for gas making at St. Louis, and is a three foot ten inch seam of very pure coal, jet black, of cubical fracture, and bears a good reputation as a fuel, for general uses.

All the coals of the Indiana field belong to the class known as bituminous. The principal varieties may be designated as follows:

Caking coal, long flame, gas and smith coal, fat coal.

Semi-caking coal, long flame.

Block coal, non-caking coal, long flame, dry burning coal, furnace coal.

Semi-block coal, long flame.

Cannel coal, long bright flame, dry burning, gas coal.

The Daviess county, cannel coal, at the base is firmly cemented to a bed of brilliant black caking coal totally unlike the former in chemical composition.

Prof. Cox remarks that this is the most remarkable seam of coal of which he has any knowledge, and when taken in connection with the Breckenridge coal, sets at defiance the theory that cannel is due to a flora distinct from that which, in general, furnished anthracite and bituminous coals. The Indiana cannel, like the Breckenridge of Kentucky, is rich in carbon oils and gas. It contains from 7 to 10½ per cent. of very white ash, and is remarkably free from pyrites. The quantity of ash greatly exceeds what we find in the caking and block coals of Indiana, though less than is found in the Breckenridge coal. In every case the ash is in excess of what could be derived from any species of plants known to botanists and in a great measure must have been furnished by water, either turbid or holding in solution mineral matter. If by the latter, then its presence must have had a marked influence in determining the character of the chemical change from wood to coal.

The following analysis will serve to show the character of some of the Indiana coals.

	Fixed Carbon.	Vol. Matter.	Water.	Ash.
Fountain County .....	54.5	36.0	5.0	4.5
Vanderberg County.....	48.5	42.0	3.5	6.0
Warwick County .....	49.5	41.5	3.5	5.5
Posey County .....	51.0	39.5	4.0	5.5
Sullivan County.....	55.0	40.0	3.5	1.5
Daviess County .....	53.5	36.0	5.5	5.0
Vermilion County.....	46.0	44.0	5.5	4.5
Parke County.....	46.5	46.0	4.0	3.5
Montgomery County .....	52.0	41.5	3.0	3.5
Clay County .....	61.5	32.5	3.5	2.5
Owen County .....	57.5	38.5	2.0	2.0
Greene County.....	63.0	29.5	7.0	0.5



## WEST VIRGINIA.

The coal measures of West Virginia underlay nearly sixteen thousand square miles of territory, of which, what are known as the Kanawha and New River Valleys, traversed by the Chesapeake & Ohio railroad, hold eight thousand. Several varieties of coal occur, among which are :—Cannel, Splint, Gas, and Bituminous. Of the Bituminous there are seams of different degrees of hardness and texture, from the friable coking coal, similar to the best Newcastle (England) coals, to the harder Splint coals, with regular cleavage, similar to the Youghiogheny coals so largely in demand in our Western and Southern cities ; of so compact a nature that it can be used in an iron blast furnace in its raw state.

The Bituminous coals are excellent steam raising fuels, and have been used in steamers, railways, and under stationary engines with good results. The Gas coal seam is identical with the Kittaning Gas coal bed, mined on the Allegheny river, in Pennsylvania, and have been used in the eastern and western markets with most satisfactory results.

The value and importance of the Kanawha Coal District, as a new source of supply from which good caking coals can be obtained, is beginning to be understood and appreciated by gas manufacturers.

These coals have established a good reputation where they have been tested and used, for the quantity, purity and illuminating power of the gas which they produce.

A series of practical tests, recently made in the apparatus of a gas light company, from ordinary average samples, of one ton (2,240 lbs.) each from five different mines, and with the regular working charges of 224 lbs., as observed and certified by Professor P. de P. Ricketts, of the School of Mines, give the following average results per ton of 2,240 lbs., viz :—

	Cubic Feet.	Candle Power.
Standard yield.....	10,000	17,414
Maximum yield.....	12,428	16,010

Coke, 33 4-5 bushels, weighing 1,518 3-10 lbs., and of good quality.

The chemical analyses of the above five samples, by Professor Ricketts give the following average results, viz :

	Per cent.
Volatile Matter.....	35.75
Fixed Carbon.....	56.65
Ash.....	5.18
Sulphur.....	1.32
Moisture.....	1.08
Specific Gravity.....	12.79
Weight of one cubic foot.....	79.78 lbs.

The capacity of the mines from which gas coals are now being shipped,



is about 150,000 tons per annum, and as the seams traverse a large area, the supply can be largely and rapidly increased.

On approaching from the eastward, the bituminous coal seams of West Virginia are first found in the tops of the mountain ranges overlooking New river, in Summers and Raleigh counties, embracing only the lowest seams of what are known as the lower coal measures. The Big Sewell mountain a prominent elevation in West Virginia, towering some 2,800 feet above sea level, and 1,500 feet above New river, forms the south-eastern edge of the "Upper Ohio coal basin." All the territory drained by the Kanawha and its tributaries, between the Falls of the Kanawha and Campbell's creek, contains the seams of coal within workable reach, above water level, or by shafts at no great depth. It can be mined very cheaply; and the quantity available is vast beyond conception. The top seam of the lower coal measures disappears beneath the Kanawha, at its confluence with the Elk river, at Charleston; while some of the coal seams reappear up the valleys formed by the Elk and Coal rivers. Cabin creek, Elk river, and Coal river are three considerable tributaries to the Kanawha, penetrating the country for long distances, and bringing into convenient working position thousands of acres of valuable coal land.

At Quinnimont, on the line of the Chesapeake and Ohio Railroad, 295 miles west of Richmond, are the works of the New River Car Co. Analysis made by J. B. Britton, gave the following results:

Coal.		Coke	
		run of mines.	from slack.
Fixed Carbon.....	75.89	Carbon.....	93.85
Volatile Matter.....	18.19	Ash.....	5.84
Ash.....	4.98	Sulphur.....	0.31
Moisture.....	0.74	Water.....	—
			2.71

This company is mining a vein about  $3\frac{1}{2}$  feet Bituminous coal, using the coke in their blast furnace, and for the manufacture of car wheels. The coke is fully equal to the famous Connellsville, of Pennsylvania.

At Nuttallburg, 316 miles west from Richmond, John Nuttall, Esq., is mining a Bituminous coal, from the lower coal measures. The vein is  $3\frac{1}{2}$  feet thick, far above water level. The coal finds a market East and West for steam purposes. The slack is made into coke, and it has been used for iron smelting, and in foundries with great success, being pronounced by those who have used it, equal to the best Connellsville.

At Hawk's Nest, 325 miles west from Richmond, are the works of the Gauley-Kanawha Co. This coal was analyzed at the School of Mines, in London, with the following result:—Carbon, 83.31; hydrogen, 5.54; oxygen and nitrogen, 6.86; sulphur, 0.74; ash, 2.15; water, 1.40.

At Cannelton, 344 miles west from Richmond, are the mines of the Can

nelton Coal Co., the product of which is so well known in the eastern and western markets. In ascending order, from the river level, the following principal seams of coal are found :—First, about 20 feet above the river, 4 ft. 6 in. of a superior quality of Bituminous coal; at 100 feet is a 7 foot seam of first-class Gas coal; at 600 feet is a seam of 5 feet of superior Splint coal, unsurpassed as an iron-making fuel; at 700 feet, is a seam of  $3\frac{1}{2}$  ft. Cannel, and  $2\frac{1}{2}$  ft. Semi-Cannel. The former is the celebrated Cannelton Cannel; the Semi-Cannel somewhat resembles the Splint coal of seam number three, is very valuable for house use, and has been satisfactorily used for gas making.

About eight hundred feet above the river, and above the "Flint Ledge," is a seam of superior Block coal, six feet in thickness, of great value for steam and iron making. In addition there are several smaller seams, varying from twelve to thirty inches in thickness, located between seams number two and three.

An analysis of the Cannelton Cannel, made by the Manhattan Gas Light Co., of New York, gave—Volatile matter, 58.0; fixed carbon, 23.5; ash, 18.5. At standard (10,000 cubic feet) it gave an illuminating power of 64.54 candles, or 12.025 cubic feet of 45.60 candles. Weight of 32 bushels of coke, 1320 pounds.

Between Cannelton and Coalburg, within a distance of about 10 miles, are located the principal Gas coal mines of this region now in operation

In the vicinity of Coalburg, 354 miles west from Richmond, are several operations. working coal which is highly appreciated by iron-masters as an excellent fuel, in its raw state, in the reduction of iron ores, and also for steam and domestic purposes in the markets reached by the Kanawha and Ohio rivers. Analyses made of the Bituminous coal from this locality show: Fixed carbon, 56.0 to 62.6; volatile matter, 40.5 to 33.3; ash, 1.5 to 1.8; water, 2.0 to 2.5.

The principal coals of the upper series are known as the Pittsburgh, Redstone, Sewickley, Waynesburg and Washington, having received these names from localities in Pennsylvania. Besides these, several other beds occur, but as they barely cross the line from Pennsylvania into West Virginia, and never become of any value in that State or this, it is unnecessary to make any further reference to them here. Of all these, the Pittsburgh alone maintains its importance throughout, as far as the examinations go. The available area of this bed, therefore, is of great economical interest.

At Peytona, in Boone county, are the mines of the Peytona Cannel Coal Co., located on Coal river, about thirty-five miles from its junction with the Great Kanawha river, 380 miles west from Richmond. The coal is transported by slackwater navigation to the mouth of Coal river, where it is transferred to the cars of the Chesapeake and Ohio R. R. The greater part of the product of the mines has been forwarded by the Kanawha and Ohio rivers to all of the important places bordering these rivers and their tributaries. The coal is also sold in the Eastern markets, where it is esteemed for gas purposes and as a grate fuel. We give place to an analysis of this coal made by the Manhattan Company. Volatile matter, 46.0; fixed carbon, 44.0; ash, 13.0. At 10,000 feet per ton, standard yield, the illuminating power is 43.12 candles, or 13,200 cubic feet of 32.66 candles. Weight of coke, 32 bushels=1380 pounds.

Many new company and individual enterprises are being located in this region, and all that we have said as to the resources of this section of the Union, is in a fair way of being recognized.

As to an outlet from this region we have the Chesapeake and Ohio Railway eastward, the building of which has done so much to open up this district. Their charges for carrying coal are extremely liberal, and now that a more decided movement seems to have been inaugurated, looking to the development of the coal trade, in time it is destined to carry to tide-water considerable quantities of coal; the figures for a term of years are given in the review of the trade of Richmond, Va. See also item upon the improvements of the Kanawha River, under "Interesting Facts and Figures."

### MISSOURI.

The coal measures of Missouri comprise an area of about 22,995 square miles, including 160 square miles in St. Louis county, 80 in St. Charles, and a few outliers in Lincoln and Warren; the remainder in northwest and western Missouri. This includes 8,406 square miles of upper or barren measures, about 2,000 square miles of exposed middle, and 12,420 of lower measures. The boundary between the middle and lower coal is not well defined, but is limited by a thick-bedded, coarse, micaceous sandstone, sometimes of no great extent, at other times of great thickness. We suppose it to enter the State in the west part of Bates county, and to pass thence via Butler to Chilhomee in Johnson county; thence northwardly four miles west of Warrensburg to four miles east of (?) Aulville, Lafayette county; thence, irregularly meandering through Lafayette county, crossing the Missouri river, passing to ten miles east of Carrollton, Carroll county; thence to the southeast corner of Livingston county, from which point it bears northeast to the centre of Linn county, and thence, northward. The southern



and eastern boundary of the lower coal measures is as follows: (through Barton, Bates, Vernon and St. Clair, the boundary has not yet been well defined;) entering the State in Barton, it passes northeast through the eastern part of Vernon; it enters St. Clair about one-half way up, on its western line, thence, meanders eastward to a point a few miles north of Osceola; thence, northward to within eight miles of Clinton, Henry county, thence northeast to the east line of Henry county; thence northwardly, with occasional variations of sandstones as much as eight miles east to Brownsville, Saline county; thence north-eastward to Marshall and thence to Miami. On the north side of the river it passes eastward, from a point opposite Arrow Rock, to the east line of Howard county; and thence, in a meandering course via Columbia, Boone county, New Bloomfield and Fulton, Callaway county, to the northeast corner of Callaway; thence, north-eastwardly to a point three miles west of the northeast corner of Montgomery county; thence northwest to near the mouth of Lick creek, Ralls county: thence, southwest to Mexico, Audrain county; from thence, to the northwest corner of Monroe county, thence, irregularly trending northward to the northwest corner of Knox county; thence, to a point on the north line of Lewis county, about 12 miles west of the Mississippi river; thence northwardly to the Des Moines river, on the north line of the State of Missouri. East of this, are small outliers in Montgomery, Warren, Lincoln and St. Louis counties, and perhaps others in southwest Missouri.

The aggregate thickness of the upper coal measures is 1,317 feet, including only about 4 feet of coal, of which there are two seams of one foot in thickness; the others are very thin seams or mere streaks. The middle coal measures include a total thickness of about 324 feet, in which are embraced about 7 feet of coal, including two workable seams of 21 and 24 inches; one other of one foot, that is worked under favorable circumstances, and six seams too thin to work. The lower measures include from 250 to 300 feet, embracing about five workable seams of coal, varying in thickness from  $1\frac{1}{2}$  to  $4\frac{1}{2}$  feet, and thin seams varying from 6 to 11 inches, and several minor seams and streaks; in all 13 feet 6 inches of coal. We therefore have in Missouri nearly 1,900 feet of coal measures with a total aggregate of 24 feet 6 inches of coal. The thinner seams of coal are not often mined, except in localities remote from railroad transportation. The coal from thicker seams (those from  $1\frac{1}{2}$  to 2 and 4 feet) is generally sold at 10 cents per bushel at the mines. The thin seam, 10 to 14 inches on Nodaway river, is sold at over 20 cents per bushel at the mines. The reason of this is the difficulty of mining (there being so much superfluous material to be removed) and the remoteness of other coals. Miners seem to prefer to work a bed of 2 to  $2\frac{1}{2}$  feet in thickness. We would consider all beds over



18 inches thick as workable coals. The estimated area, where such may be reached within 200 feet from the surface, is about 7,000 square miles. The coal is bituminous, and the product may be safely estimated at 800,000 tons.

The following is a condensed vertical section of the coal measures:

No.	Locality.
1—339 feet, including 230 feet above the connected section.....	
2—12 inches coal.....	Holt, west part of Nodaway and northwardly; also White Cloud, Kansas.
3—392 feet.....	
4—12 inches coal.....	Andrew, Buchanan, De Kalk, Gentry and Platte
5—207 feet.....	
6—10 inches coal.....	Platte county.
7—379 feet to base of upper coal measures.....	
8—3 inches coal at top of middle coal measures.....	Pleasant Hill, Missouri City and Princeton Mercer County.
9—164 feet.....	
10—1 foot coal.....	Cass, Johnson, Lafayette and Livingston, also Grundy.
11—70 feet.....	
12—22 feet (Lexington coal).....	Lafayette, Johnson and Ray.
13—36 feet.....	
14—7 inches coal.....	Lafayette and Ray.
15—14 feet.....	
16—21 inches coal.....	Lafayette, Johnson, Carroll and Livingston.
17—59 to 90 feet.....	
18—1½ feet (Warrensburgh coal).....	Johnson, Henry and Charitan.
19—52 feet.....	
20—7 inches coal.....	Johnson.
21—18 feet.....	
22—1 foot 8 inches coal.....	Johnson.
23—18 feet.....	
24—8 inches coal.....	Johnson.
25—4 feet.....	
26—2 feet coal.....	Henry.
27—48 feet.....	
28—2½ feet to 4 feet 5 inches coal.....	Randolph, Boone, Callaway, Johnson, Henry, Vernon, Bates, Adair, Sullivan, Putnam, Audrain and Macon.
29—11 feet.....	Macon.
30—11 inches coal.....	Macon, Henry and Johnson.
31—About 13 feet.....	
32—2 feet coal; 10 inches of clay near base.....	Ralls, Audrain, St. Louis, St. Charles and Montgomery, Henry and Johnson.

## O H I O .

The coal measures within this State occupy a space of about 180 miles in length by 80 in breadth at the widest part, with an area of about 10,000 square miles, extending along the Ohio river from Trumbull county, on the north, to near the mouth of the Scioto, on the south. The counties wholly underlain with coal are Mahoning, Columbiana, Stark, Holmes, Tuscarawas, Carroll, Jefferson, Harrison, Belmont, Guernsey, Coshocton, Muskingum,

Perry, Noble, Morgan, Monroe, Washington, Athens, Miegs, Galla, Lawrence, and nearly all of Jackson. The counties of which the eastern or southeastern parts only are underlain with coal are Trumbull, Summit, Medina, Wayne, Licking, Fairfield, Hocking, Vinton, and Scioto. There are small detached basins in Wayne, Ashland, Richland, and Knox counties. The boundary on the east is the State line, the same field extending eastward over all western Pennsylvania.

Prof. J. S. Newberry, divides the coals of Ohio into three classes—first, the dry, open-burning or furnace coals; second, cementing or coking coals; third, cannel coals, the first, which is popularly known as block coal, includes those that do not coke and adhere in the furnace, and are such as may be used in the raw state for the manufacture of iron. The second, embracing by far the greater portion, are of the ordinary coking, bituminous kinds, which to a greater or less degree melt and agglutinate by heat. The third variety consists of the cannel coals, which resemble a dark shale, highly impregnated with bitumen, and burns with a bright flame, but does not agglutinate.

The chief mining regions of Ohio are the Mahoning Valley, the Tuscarawas Valley, the Hocking Valley, including the Straitsville and Shawnee mines, the Salineville region, the Pomeroy region, the Bellaire region, the Steubenville region, the Jackson region, the Cambridge region, the Coshoc-ton region, the Leetonia region, and the Ironton region.

The mines of Mahoning Valley, the Tuscarawas Valley, and the Jackson region are all opened on the lower coal of the measures, called Briar Hill coal, Block coal, furnace coal, etc. It is usually about four feet thick. The mines of Hocking region, Steubenville, part of Salineville, Cambridge, are opened on No. 6, which ranges from 4 to 13 feet of thickness and is open burning in quality also. The others are worked in each of the different beds, of which there are ten altogether of minable thickness.

The chemical analysis of the Ohio coals shows that the relative amount of moisture varies from 1.10 per cent. to something over 9.10 per cent. The amount of volatile matter varies from 28 per cent to something over 40 per cent. Fixed carbon varied from 34.10 (in the upper coal from Holmes county) to 65.90 (in the coal from Steubenville shaft.) The ash found in eleven Ohio cannel coals was 12.827 per cent. The average proportion of sulphur was 1.551 per cent, that from the lower half of the State being 1.229 per cent. and that of the coal from the upper half 1.836 per cent.

Coal was discovered in Tallmadge, a mile west of the Centre, as early as 1810. It was visible in a small ravine, where for many years blacksmiths from the adjacent country came and dug it from an open pit. At that time no other coal was known in Northern Ohio. As early as 1755, mineral coal

had been discovered near Bolivar, in Tuscarawas county, by its being seen on fire, but it was not dug or mined for use as fuel, in this part of the State, prior to the year 1810. The seam was four feet thick, and was regularly mined in 1820.

The Perry county coal field is new, dating back only to 1870 ; yet there is more coal annually produced in this county, than in any other in the state. The coal is of the same character as the block coal of Mercer, Trumbull, Mahoning and other adjoining counties, is eleven feet thick ; there are two other veins, one under and one above the "great vein," aggregating another eleven feet making in all twenty-two feet of coal in three veins, in the same hill, all above the water level.

Regarding the coal resources of the State of Ohio, the Inspector of Mines, Andrew Roy, reports that there are sixteen different seams of coal which exceed two feet in thickness. There are several other seams, but they are very thin, not exceeding two to six inches in height, and often of quite limited area. Thirteen or fourteen of the series are of workable thickness in many places of the coal field, but with the exception of No. 6, all the lower workable coals are subject to faults, or become so reduced in height as to be of little or no commercial value over large areas where they are due. Even No. 6, which, in many places in Perry, Jefferson, and Tuscarawas counties, rises to the magnificent height of eight or ten feet, dwarfs to two and one-half feet, then down to a mere trace, and sometimes disappears altogether. No. 8, the Pittsburgh seam, is remarkable alike for its continuity wherever it is due, and for its presence in workable height.

"Though there are numerous wants in the different coal beds of the State, there is a general continuity of the seams from outcrop to outcrop. The coals of the Mahoning valley and Massillon regions have their representatives in the Jackson and Lawrence districts. It is suggested that the wants or interruptions are the result of water spaces existing in the old coal plain at the time of the deposition of the coal vegetation, and also of denuding forces and the rolling or hilly character of the coal marsh. Where wants are met in any of the seams having level floors, the coal has been eroded by currents of water in rapid motion passing over the loosely matted peaty material, and cutting or washing channels through part or the whole thickness of the peat bog during the first stages of the subsidence of the coal. Sandstones, fire-clays, or shales, usually the former, are found usurping the place of the eroded coal where wants are found in any of the seams due to erosive agencies or to original water spaces. The floor of the coal beds is almost invariably wavy and rolling, the high arches or hills containing



barren ground. The coal is seen to become gradually thinner in ascending these hills, and finally to disappear altogether. This wavy character of the coal floors is more marked in the lower than in the upper coals of the series, and is most marked of all in the lowest seam, or Coal No. 1.

"The strata associated with the different beds of coal are composed of sheets of shales, sandstones, limestones, iron ores, and fire clays in alternating layers. None of these sheets, except the fire-clays forming the floor of the coal beds, are persistent like the coals, but appear and disappear at frequent intervals. The shales are replaced by sandstones, the sandstones by shales, the limestones change to pure or calcareous shale or sandstone, and the iron ores also become changed to other rocks. The first deposition of sedimentary material which formed over the coal after the subsidence of the coal marsh, was very generally mud (now shale), though sandstone, impregnated with the remains of the coal flora, showing that this was the first formation, is sometimes found forming the coal roof. Frequently a sandstone is met, but shale was the first deposition, and was subsequently removed. None of the sheets forming the coal strata are very thick. Masses of material, either sandstone or shale, several hundred feet in thickness, are met, but on close examination they are found to change in color and character, the alternating shales being black, blue, gray, etc., and the sandstones being light, red, buff, gray, etc.

The coal production has been, 5,315,294 tons in 1872 ; 5,450,028 in 1873 ; 3,267,585 in 1874 ; 4,868,259 in 1875 ; 3,500,000 in 1876 ; 5,250,000 in 1877.

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## TENNESSEE.

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This is included in the great Appalachian coal field of the United States, which extends from Pennsylvania to Alabama, and comprises 80,000 square miles, 60,000 of which will furnish available coal. Its area in Tennessee is 5,100 square miles, which area includes the whole of the Cumberland Tableland. This division of the State forms an irregular quadrilateral, having the northern and southern boundaries nearly parallel, the former being about 71 miles long, and the latter or southern boundary being about 50 miles in length. The other sides run diagonally through the State in a northeasterly and southwesterly direction. A central longitudinal line would bear about north 20° east.

Between the Mountain limestone and the top of the main conglomerate which forms the general surface of the Tableland, there is a series of strata composed of shales, sandstones, fire-clay and coal. The average thickness of this series, including the conglomerate rock, is about four hundred feet,



thinning out in some of the counties to two hundred feet or less. This series constitutes the Lower coal measures. There are three well defined seams of coal found in what is known as the Lower coal measures :

1. *The Slate Vein*.—This occurs from twenty to sixty feet above the Mountain limestone, and is called the *Slate Vein*, because overlying it is a bed of shale from fifteen to twenty feet thick. A rusty-colored shale often appears beneath. The coal in this seam is from one to three feet thick, and is very hard and lustrous.

2. *The Cliff Vein*.—This lies sixty to eighty feet above the Slate Vein, and is capped by a heavy sandstone, which forms a well defined cliff above the coal. This seam is from one to twelve feet thick ; coal hard and much like that of the Slate Vein.

3. *The Sub-conglomerate Vein*.—This is too thin to work at the outcrop, and is important only in showing its wonderful persistency. It is from six inches to two feet thick, affording excellent coal.

These three seams are the only beds of coal that are known to exist in the Lower coal measures. One other has been suspected, but there are reasons for believing that it is a drop from the Cliff Vein.

Superimposed upon the main or table-covering conglomerate are many billowy ridges composed of sandstone and shales, with several coal seams. In the region around Tracy City there are usually four of these seams, only one of which, the main Sewanee, may be considered valuable. At Coal Creek, in Anderson County, where the Upper coal measures reach a much greater thickness, the number of seams is greatly increased. According to Prof. Bradley, there are twenty-one seams at Coal Creek, eight of which are workable. The Seams in the Upper coal measures appear to be more uniform in thickness, but the coal usually has not the hardness, nor will it bear transportation so well as that of the Lower Measures. The principal seams are found in about the following order.

1. Twenty feet above the main conglomerate which divides the Upper from the Lower coal measures, the first seam is met with, which is usually from one to two feet thick, sometimes swelling out to a thickness of four feet, with thirty feet of shale above separating it from.

2. *The Main Sewanee*.—This varies in thickness, from two to seven feet, usually about four feet, and is capped by a bed of shale from fifteen to twenty feet thick. Sometimes the sandstone lies immediately above the coal. The quality of this coal is well known, on account of its having been mined more extensively than any other in the State. It is a very pure coal, bituminous, spumous, fragile with contorted laminæ ; highly esteemed as a heat generator, being what is called a long-flamed coal. It makes ex-

cellent coke, which is used extensively in the manufacture of pig iron, and in rolling mills. The greatest and almost the only objection to the coal of this seam is its tendency to slack or to disintegrate upon exposure to the atmosphere. At a few of the outcrops of this seam, however, the coal is cubical and of great specific gravity, preserving the purity of the upper seams and the hardness of the lower. Such coal is found at Deakin's bank, in Sequatchee county, and at Kelly's bank, in Marion.

3d. and 4th. Two thin seams of coal 160 and 200 feet above the Main Sewanee. These seams are almost useless, the thickest showing only one foot of good coal.

To summarize: The coal-field is separated by the main conglomerate into the Upper and Lower coal measures. The Lower measures have three seams of coal, two of which are workable. The Upper Measures in the northeastern part of the coal-field have eight workable seams, and in the southern part only one, which is the Main Sewanee.

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## ARKANSAS.

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The coal field of Arkansas has an area of 12,000 square miles, in twelve counties. The coal found is semi-bituminous or semi-anthracite. A bed of semi-bituminous coal nine feet thick is reported in Sebastian County. The Spadra semi-anthracite is the only coal that is known in market to any extent, and an account of its location, etc., will prove interesting. "This name is given to a deposit of semi-anthracite coal, three feet thick, found at Spadra, in Johnson County, 105 miles from Little Rock, now being worked by the Spadra Coal and Iron Company. It lies almost horizontal, with a slight dip to the north. It crops out on the river bank, and is traceable along the river front. On digging anywhere, the same vein, from  $3\frac{1}{2}$  to 4 feet thick, is invariably struck within 55 feet of the level of the river front. The product is about 5,000 tons. The existence of a second vein, which is, as near as can be ascertained, about 30 feet below the one now working, is a matter of development. The coal can be placed at Little Rock at \$3.25 a ton; at the mouth of the Arkansas River, \$3.75 a ton; at New Orleans for \$5 a ton; at St. Louis, \$6.75 per ton."

The only coal to compete with on the lower Mississippi, from the mouth of the Arkansas to New Orleans, 600 miles—which section of country consumes about one million of tons per annum—is the Bituminous coal, principally furnished by Pittsburgh.

The mines of the Ouita Coal Co., producing an excellent variety of this semi-anthracite, are seventy-two miles from Little Rock; the vein is 32

inches thick. Analysis gave 80.46 fixed carbon; 12.66 volatile matter; ash, 5.11; water, 1.77; color of ash, light brown.

Professor Owen gives an analysis of the coal in the First Geological Report on Arkansas, page 130. It was also analysed by Mr. I. A. Liebig, and by L. C. Bierwirth, with the following results:

	OWEN.	LIEBIG.	BIERWIRTH.
Moisture.....	0.5	1.524	0.680
Volatile and combustible gases.....	7.9	7.527	10.521
Fixed Carbon.....	85.6	85.081	83.719
Ashes.....	6.0	5.468	5.080
Total.....	100.	100.	100.
Specific gravity.....	1.335	1.3408	1.3112

## IOWA.

The coal industry of this State has made great progress during the last few years, especially in the county of Polk, which is situated centrally as regards the field. For the most part the demand and market has been purely local, but for the last two years an export trade of some value has sprung up and is still on the increase; northward into Minnesota and Wisconsin, southward into Kansas, and westward into Nebraska, etc., The chief customers are the various railroads which in such number traverse the State, and then again derive a considerable portion of their local freight from the coal industry.

In the year 1874 the last general Census of the State was taken, and the assessors were all supplied with printed forms of interrogatories, intended to elicit complete information regarding this important industry; but the result was not entirely satisfactory, as some coal companies appeared unwilling to give full data regarding their works, mines, development thereof, output, ruling prices, etc. However a close approximation was obtained, and from it we find that in the year '74, there was 372 "banks" or mines opened, and being worked, employing 2928 hands of all grades in their development, with a total output for the year of 1,231,547 tons, of an estimated value of \$2,600,140. Since that time, during the last two years, several new mines have been opened, and the number now being worked is probably over 400. Coal has also been discovered in other counties than those worked in '74, so that it is now found and worked in 26 out of the total of 100 counties in the State.

The yield for a series of years past (those in which Censuses were taken) has been as follows:

1862.....	36,074 tons.	1866.....	99,320 tons.
1864.....	66,663 tons.	1868.....	241,453 tons.
1874.....			1,231,547 tons.



And for the year 1876 at the same rate of increase as from 1868 to 1874, the output would not be less than 1,561,580 tons, which is probably under the mark.

The whole coal field is well intersected by railroads, giving access to every important point therein, and the Des Moines river bisects it longitudinally into two very nearly equal parts.

In the years '66, '67, '68, and '69, a Geological Survey of the State was made under the direction of Dr. Chas. A. White, State Geologist. The Survey though not exhaustive, gave very valuable results, and we hope it will soon be resumed to include all those portions of the State yet unexamined. The various geological series are all developed very uniformly, the common longitudinal axis or direction of *strike* being from N. W. to S. E., in fact in the same direction as the Des Moines, and Cedar rivers and others.

Commencing with the oldest geological series represented in the State, the Azoic, we find a very curious outcrop of Sioux Quartzite, occupying an area of some 20 sq. miles in the extreme northwestern corner of the State in Lyon's County. Following down the Big Sioux river, about 35 miles below the former, the cretaceous series appears and continues along that river with an average width of some 12 or 14 miles, to a point on the Missouri river, about 18 miles below the entrance of the Big Sioux. This series does not occur again in Iowa, except in small isolated tracts some ten in number, in counties of Cass, Montgomery, and Carroll, Greene and Guthrie, and its total area in the State amounts to some 850 sq. miles. Following down the Missouri, we meet the outcrop of the upper coal measures, in the southwest corner of Monona County, at a point about fifteen miles above the entrance of the Little Sioux river. These measures cover a triangular area in the southwest portion of the State, of about 9,400 square miles, bounded on the west by the Missouri river, south by the Missouri State line, and north by a line somewhat irregular, but running approximately in a S. E. direction, intersecting the southern boundary of the State, at a point in Appanoose County about eight miles west of the Chariton river.

In the Upper coal measures, comparatively few developments have been made. They comprised in 1874, in Adams County, 9 banks open, employing 21 hands, with a production for that year of 3,000 tons, valued at \$11,250. In Taylor County, lying immediately south of Adams, the number of banks open was 3, of hands employed 22, production, 1,160 tons, of a value of \$4,320. In Wayne County there were 9 banks open, employing 49 hands, producing 4,034 tons, of \$9,068 in value. These comprise almost all the mines working the upper coal measures in the year 1874, with the exception perhaps of a few in Lucas and Appanoose Counties,



which are both crossed by the division between the upper and middle coal measures, but the mines in which most probably belong to the next or middle coal measures. The middle and the lower coal measures constitute the next geological series or division to the east of the last described, and their most western outcrop is in Audubon County, at a point about 40 miles west of Exira. Thence the edge of outcrop runs in a direction (approximating N. by E. to the northwest corner of Webster County, thence east by south to a point a few miles east of Eldora in Hardin County, thence south to the centre of the south line of Marshall County, thence in a southeasterly direction parallel to the Des Moines river, to the north-east corner of Jefferson County, thence south to the south line of the state; this area comprising about 10,800 sq. miles the whole or parts of 26 counties, and constituting the true coal field of Iowa. The number of tons mined in 1874 in these measures was 1,223, 453, of a value of \$2,575,502; were from 351 mines or banks, employing a force of 2,836 hands.

North and east of the lower coal measures is the area covered by the sub-carboniferous rocks and clays, with a frontage on the Mississippi of nearly 100 miles, and a total average of about 7,200 sq. miles. Next comes the Devonian area of about 8,860 sq. miles fronting for about 25 miles on the Mississippi. Next the much smaller area of the Upper Silurian, series, 4,320 sq. miles, followed by the Lower Silurian, occupying some 2,230 sq. miles in the north-east corner of the state, and a long narrow strip along the Mississippi giving a frontage of over 160 miles. The surface of Iowa may be subdivided geologically then as follows :

Cretaceous.....	850 square miles.
Upper coal measures.....	9,400      "
Middle and lower coal measures.....	10,000      "
Subcarboniferous.....	7,200      "
Devonian.....	8,860      "
Upper Silurian.....	4,320      "
Lower Silurian.....	2,230      "
Azoic.....	20      "
Undetermined as yet.....	11,365      "
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Total area of Iowa.....	55,045      "

## ALABAMA.

There are two distinct coal formations in Alabama, the Coosa being a continuation of the Cahaba; originally the Warrior and Cahaba were one and the same, but became separated by the Silurian strata being thrown up between them, and they now form two fields.

On the Selma, Rome and Dalton Railroad, at a point fifty-five miles from Selma, a branch railroad, runs to the openings on a coal seam, which averages from two feet six inches to four feet in thickness, it is very hard, Semi-bituminous, red ash, free burning, non-coking, and a good household fuel. Being above water level, no machinery for either hoisting or pumping is required.

The principal market for these coals is the city of Selma, for household use, high freights on the railroad preventing its reaching distant points. The true destination for this coal would be one of the Gulf ports, say Pensacola, distant from Montevallo 270 miles, to be sold as a steam coal for marine purposes; and when Southern railroads learn that it is to their interest to have cheap coal freights, it will be carried there.

At Celera, seven miles northeast of Montevallo, the Selma, Rome and Dalton Railroad is crossed by the South and North Railroad, a continuation of the Louisville and Nashville Railroad to Montgomery. On this road, seventeen miles north of Calera, the Cahaba coal field is again reached, at Helena Station. Several companies are working the seam which is here, from two and a half to three feet; a good coking coal, mainly above water level.

Crossing the Cahaba River, we find we have passed over the coal basin, and the coal dips south. The coal is a coking coal of fair quality, not very free-burning, and averages from two feet six inches to three feet thick. The next seam that is opened is five feet in thickness, also above water level, and a most excellent coal for blacksmiths's use and for making coke, but is far too friable for either steamer or household use. This coal averages from four to five feet in thickness.

In the Warrior field developments have been made sufficient to show six workable seams of coal, many of which are coking, varying from two and a half feet to seven feet in thickness. The dip is slight compared with that of Cahaba, although the quality is not quite equal to some of the seams in the latter formation, most of the Warrior containing small bands of shale. One of the upper series has been struck, showing eight feet of coal, free from slate and a good coking coal.

Both the Cahaba and Warrior fields are crossed by the extension of the Louisville road from Nashville south to Montgomery and Mobile, and when the Cincinnati Southern, now in course of construction, shall be completed, the outlets for the new industry that has sprung up in this part of the south since the war, will be all that can be desired. At the point where the railroad intersects the Cahaba in its course through the valley formed by the synclinal position of the strata on either side, from fifteen to twenty

workable seams of coal are exposed, aggregating a total thickness of not less than sixty feet. This field is twelve miles broad from north to south, by forty miles in length, aggregating five hundred square miles. The Warrior coal field, which is the largest of the two, stretches nearly across the State, and extends north from Birmingham nearly to the Tennessee river. The coal covers an area of over five thousand square miles. The beds escaped the greatest force of the upheaval that brought them to the surface, and are consequently much less inclined than those of the Cahaba, which lie at an angle, usually about thirty-five degrees, while the former seldom reaches twenty :—

Component Parts by Analysis.	Cahaba Level Bed.	Cahaba Mulberry Creek.	Cahaba. Southern End.	Warrior.
Volatile matter.....	35.51	36.68	34.49	40.60
Fixed carbon.....	57.42	57.23	60.09	54.07
Ashes.....	6.31	5.30	4.32	8.09
Moisture.....	.76	.79	.93	1.18
Sulphur.....	Trace	Trace	.17	1.06

Production has been as below :—

On the line of	1874.	1875.	1876.	1877.
S. and N. R. R.....	33,139	57,516	76,140	139,182
S. R. and D. R. R.....	14,750	14,890	20,500	22,500
A. and C.....	2,000	2,500	5,000	9,000
Scattering.....	.....	1,000	1,000	1,500
Total tons of 2,000 lbs.....	49,889	75,806	102,640	172,182

## ILLINOIS.

The valuable features of the coal found in this State are, that there is plenty of it, that it is very widely distributed over the State, and readily accessible. Although it is generally necessary to mine it by means of shafts, the coal is reached at so reasonable a depth from the surface, that its mining is done without unusual expense. The railroads traversing all parts of the State, furnish an abundance of cheap transportation, and there is a large market for the coal that is produced.

The United States census of 1870 reports the production of coal in Illinois at 2,629,563 tons. To those accustomed to the large production of Eastern mines near our seaboard, these figures may appear small, but it should be considered that the coal business in the West is yet in its infancy. In La Salle county, there are three seams of coal, the upper, four and a half to five feet thick, the middle, usually six feet, and the lower four feet. The most popular in the market is the middle, as it makes a dense fire, and is largely used for steam and domestic uses. In 1870, the product was 173,864



tons, according to the census reports, and this has probably been doubled by this time. What is known as Wilmington coal is found in Will and Livingston Counties ; this is the cheap steam coal of Chicago, it is mined at and near Braidwood, some 53 miles south of Chicago, on the Chicago and Alton railroad, the seam averaging three feet in thickness. The amount produced in 1875 was 512,800 tons, and 510,533 tons in 1876. For 1877, the output was only 289,126 tons, there being a lock-out of the miners, from April to December, eight months. The principal companies mining in this field are, the Wilmington and Vermillion Company, and the Eureka Coal Company. The results of analysis of this coal are given below:—

	I.	II.
Fixed carbon.....	47.405	47.939
Volatile matter.....	39.642	39.761
Water.....	6.981	7.013
Ash.....	5.972	5.287

St. Louis, Missouri, obtains a large supply of Bituminous coal from the Belleville district, in St. Clair county, Illinois. This county contains 450 square miles of coal, and the last census returns show a production in this county of 793,810 tons. The principal seam worked is from five to seven feet in thickness, and is economically mined. Analysis of this coal shows : Water, 6 ; volatile matter, 33.8 ; fixed carbon, 55.2 ; ash, 5.

In Vermillion county the seam is six feet thick, furnishing a good fat, soft caking coal. The vein is from seventy to one hundred feet below the surface. Mining was begun in 1867. The annual product is 250,000 tons.

In Williamson county, has been found a seam of nine feet in thickness which does not appear in the reports of the Geological Survey of this State; it is being made into coke for use at the furnaces at Grand Tower ; analysis of the coke, showed fixed carbon, 85.79 ; volatile matter, 2.42 ; moisture, 2.48 ; and ash, 8.31.

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## KENTUCKY.

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This State is mineralogically endowed with two distinct coal fields. The coal of Illinois enters the State near Hawesville, and occupies nearly the whole of twelve counties in the northwestern portion of the State. The Appalachian coal crosses the Ohio river, a little above Portsmouth, and fills up nearly the whole of the eastern twenty counties.

The Kentucky river has its headwaters altogether among the coal bearing rocks. A section made from Red river in Wolfe county to the mouth of Troublesome creek in Breathitt county establishes the fact that five good



veins of coal exist. The indications are that the coal measures thicken, and the number of workable coals increase south-easterly from the mouth of Troublesome Creek. Cannel coal of excellent quality is found over an extended area of country bordering upon the stream and its tributaries. In addition to the numerous workable coals above the conglomerate sandstone in this region, there are two seams below, that are of workable thickness and of good quality.

Prof. D. D. Owen, before his demise, made a mineralogical and geological survey of the State, but the work was not completed. A large portion of the eastern coal-field was unfinished. Since the suspension of the survey new discoveries have been made—new coals opened and brought into market. Approaching the southeastern counties, by the Cumberland Gap branch of the Louisville and Nashville Railroad in the county of Rock Castle, we first encounter the sub-carboniferous limestone, which is the floor of the coal measures of the State. The limestone series are here three hundred and fifty feet thick, composed of an underlying sandstone, some few feet of colored shales, white marble beds, cherty beds, and encrinural limestone. Upon this member of the group reposes the coal conglomerate, frequently eighty and ninety feet thick. Ten miles from Mount Vernon, the country-seat of Rock Castle County, the coal measures of the three hills where the coal is opened rests immediately upon the limestone without the intervention of the conglomerate. There are two veins of coals in the hills. The lower one, at an elevation of fifty feet above the railroad, is too impure to be of any commercial value. The upper coal, about fifty feet beneath the summit of the hills, is being worked to advantage. The upper coal is three feet thick, and has the usual appearance of a good, dry-burning bituminous coal.

The coal field west of the Louisville and Nashville Railroad was first developed during the year 1872. In form this coal field is somewhat basin like; that is, the beds incline from the margin towards the centre. It underlies either in whole, or in part the counties of Christian, Butler, Hopkins, Muhlenburg, Hart, Grayson, McLean, Webster, Union, Henderson, Davies, Ohio, Hancock and Breckenridge, or a total area of nearly four thousand square miles for this coal field. Twelve beds of coal have been identified in the measures, but the results of the survey point to eight as the number of beds that will prove sufficiently trustworthy to receive final numbers. The markets for the coal are Nashville Tenn., and points on line of railroad from Evansville, Ind., to Nashville, Tenn. There are twelve veins of coal, ranging from two feet to eight feet in thickness. For steam purposes the coal rates at 99, Pittsburgh coal being a hundred. For gas

purposes four feet to the pound is obtained, but there is more sulphur than in Pittsburgh coal.

We append an analysis of the celebrated Breckenridge cannel coal :—  
Volatile matter, 54.40 ; fixed carbon, 32.00 ; ash, 12.30 ; moisture, 1.30.

It is an error to suppose that the coal of Kentucky contains a greater percentage of sulphur than the coals of neighboring regions. In Indiana and Illinois certain coal beds have won a higher reputation than has hitherto been accorded the Kentucky coals, but later investigations have developed the fact that here, too, are exceptionally good beds, unexcelled, perhaps, by the most famous of those States. They have hitherto escaped general notice, from the fact that they do not lie in what has been the district of active mining operations, although within convenient reach of transportation facilities. The aggregate annual output of Kentucky, may be set down at 850,000 tons. The western part of the State furnishes the greater portion of this amount. The mines on the St. Louis and Southeastern, and the Paducah and Elizabethtown roads, supplying 360,000 tons annually. The Green and Ohio river mines, 175,000 tons. (The Paducah and Elizabethtown road carried 220,000 tons, last year.)

The Louisville and Nashville road may be set down as carrying 65,000 tons out of the Eastern coal field. There is also a large amount sent from this coal field, via the Cumberland river, Kentucky river, and Boyd and Lawrence counties, on the Ohio river. The development of the coal resources of Kentucky have been progressing at a most rapid rate within a year or two. This is shown from the increase in the business of the Paducah and Elizabethtown road. In 1872, the total business was 654,000 bushels, and in 1877, it was 5,400,000 bushels. Louisville consumes annually, about 12,000,000 bushels of coal, yet from lack of rail facilities, the receipts have been eleven of Pittsburgh coal, to one of Kentucky.

## IMPROVEMENTS ON THE KANAWHA.

The government improvements of the navigation of the Kanawha river, by dams and locks, now under way, will tend to develop the resources of this\*most wonderful region. Ten locks and dams will furnish slack-water navigation from the Ohio river to Cannellton, a distance of eighty-five miles, the cost of which will be about \$250,000 for each dam with lock. Of these ten, there will be three above and seven below Charleston. These locks and dams are being constructed of hewn stone, and in the most workmanlike manner. In nine of the dams, however, there is to be an "open pass," two hundred and fifty feet in length. In this "open pass," there is to be a wooden and iron structure, so arranged that it can be elevated in low water, and thereby furnish seven feet of water in the shallowest places in the river, and can be lowered during high water, and thereby furnish free and unobstructed navigation during the rises in the river. Hence, these dams are called "movable dams." The first nine dams from the Ohio river are to be movable dams, which will furnish seven feet of water from Paint creek to the Ohio river during low water, and an open river during high water. The locations and lifts of the dams will be as follows:—At or near the mouth of the Kanawha, eight feet lift; at or near Debby's Ripple, seven feet lift; at or near Gillespie's Ripple, six feet lift; at or near Red House Shoals, six and one-half feet lift; at or near Johnson's Shoals, seven feet lift; at or near New-comer's Shoals, six and one-half feet lift; at or near Island Shoals, seven feet lift; at Brownstown, seven feet lift; at Cabin Creek, seven feet lift; at or near Paint Creek, fifteen feet lift; total "lifts," seventy-seven feet, in a distance of eighty-five miles.

We give below prices for Schuylkill White Ash Lump coal, on board vessels at Philadelphia, from 1834 to 1875, inclusive, prepared originally by W. G. Neilson, and continued by I. W. Morris, Jr.—being the average rates obtained from sales during the year:—

Years.	Prices.	Years.	Prices.	Years.	Prices.	Years.	Prices.
1834.....	\$4 84	1845.....	\$3 46	1856.....	\$4 11	1866.....	\$5 80
1835.....	4 84	1846.....	3 90	1857.....	3 87	1867.....	4 37
1836.....	6 64	1847.....	3 80	1858.....	3 43	1868.....	3 83
1837.....	6 72	1848.....	3 50	1859.....	3 25	1869.....	5 31
1838.....	5 27	1849.....	3 62	1860.....	3 40	1870.....	4 39
1839.....	5 00	1850.....	3 64	1861.....	3 39	1871.....	4 46
1840.....	4 91	1851.....	3 34	1862.....	4 14	1872.....	3 74
1841.....	5 79	1852.....	3 46	1863.....	6 06	1873.....	4 27
1842.....	4 18	1853.....	3 70	1864.....	†8 39	1874.....	4 55
1843.....	3 27	1854.....	5 19	1865.....	7 86	1875.....	4 39
1844.....	*3 20	1855.....	4 49				

\*Lowest point. †Highest point.

The following is of interest, as showing the relative value of the coals found on the Pacific coast, compared with the coal from Cumberland region, in Maryland:—

	A.	B.	C.	D.	E.	F.
Alaska.....	7.94	7.96	60.0	40.0	12.3	5.41
Coos Bay.....	10.24	7.35	60.7	39.3	6.2	6.91
Seattle.....	8.38	8.57	63.0	37.0	16.6	5.71
Black Diamond.....	8.38	8.73	51.6	48.4	8.0	5.71
Bellingham Bay.....	10.58	5.51	67.0	33.0	16.0	7.21
Anthracite.....	7.40	....	95.6	4.4	7.2	5.04
Cumberland, Maryland.....	13.92	3.52	88.2	11.8	3.2	9.48

EXPLANATION.—A, heating power, one pound water; B, sulphur to ton, in pounds; C, coke, per cent.; D, volatile matter; E, Ash, per cent.; F, relative value per pound.



## ANTHRACITE AT NEW BRUNSWICK, N. S.

Anthracite is found near Lepreux, Charlotte county. It has by analysis, 1.25 water, 4.33 volatile matter, 57.49 fixed carbon, and 36.88 impurities.

## PROPORTIONS OF COAL MINED IN PENNSYLVANIA.

In the Lehigh region, the Mammoth vein supplies 67.78 per cent. of the total shipments; the Buck mountain, 22.75 per cent., and the Wharton. 9.47 per cent.

## ANTHRACITE IN NEW MEXICO.

Anthracite has been found twenty-three miles southeast of Santa Fe, which is said to contain  $87\frac{1}{2}$  per cent. of fixed carbon.

## ANTHRACITE—FIRST KNOWLEDGE OR USE OF.

In 1768, Anthracite coal first used in Wyoming Valley, by Obadiah Gore, blacksmith.  
In 1775 and 1776, several boat loads of Anthracite coal were sent from Wyoming down the Susquehanna, and thence hauled to the Carlisle barracks to manufacture arms.

In 1790, coal first known in Schuylkill county.

In 1794, blacksmiths used it in Schuylkill county.

In 1808, used in grates by Judge Fell, of Wilkesbarre.

In 1812, Colonel George Shoemaker hauled nine wagon-loads of coal from Pottsville to Philadelphia, and gave away the coal.

In 1814, Charles Miner sent an ark load, (twenty-four tons of coal,) from Mauch Chunk, via the Lehigh and Delaware, to Philadelphia.

In 1815, Schuylkill navigation commenced.

In 1820, three hundred and sixty-five tons of coal shipped by the Lehigh canal.

## ANALYSIS OF VANCOUVER ISLAND COAL.

	Slow-Coking.	Fast-Coking.
Water.....	1.47	1.47
Volatile Matter.....	28.19	32.69
Fixed Carbon.....	64.05	59.55
Ash.....	6.29	6.29

## ERIE, PENNSYLVANIA.

There is an increasing business done at this port. We have no returns for 1877:—

1876—Anthracite received..... 130,000 tons.

1876—Bituminous received..... 247,014 tons.

Twelve per cent. of the Anthracite, and twenty-five per cent. of the Bituminous was used in the city, the balance exported by lake and rail. Shipments by lake have been:—

Years.	Tons.	Years.	Tons.
1868.....	259,012	1873.....	325,711
1869.....	309,434	1874.....	217,500
1870.....	312,081	1875.....	174,672
1871.....	377,457	1876.....	233,012
1872.....	350,159	1877.....	



## WEIGHT OF RAIL, ETC.

The following table will prove of value to many of our subscribers in the coal regions ; it was originally prepared by Messrs. Porter Bell & Co., of Pittsburgh, Pa.

Tons per mile required of rails of the following weights per yard:—

Weight per yard.	Tons of 2,240 lbs. per mile.		Weight per yard.	Tons of 2,240 lbs. per mile.	
16 lbs.	25 tons,	320 lbs.	35 lbs.	55 tons,	..... lbs.
20 lbs.	31 tons,	960 lbs.	40 lbs.	62 tons,	1,920 lbs.
25 lbs.	39 tons,	640 lbs.	45 lbs.	70 tons,	1,600 lbs.
28 lbs.	44 tons,	.... lbs.	56 lbs.	88 tons,	..... lbs.
30 lbs.	47 tons,	320 lbs.	60 lbs.	94 tons,	640 lbs.

## CROSS-TIES PER MILE.

Centre to centre.	Ties.
1½ feet.....	3,520
1¾ feet.....	3,017
2 feet.....	2,640
2¼ feet.....	2,348
2½ feet.....	2,113

## SPlice JOINTS PER MILE.

Two bars and four bolts and nuts  
to each joint.

Rails 20 feet long.....	528 joints.
Rails 24 feet long.....	440 joints.
Rails 26 feet long.....	406 joints.
Rails 28 feet long.....	378 joints.
Rails 30 feet long.....	352 joints.

## ANTHRACITE IN RHODE ISLAND.

Professor Jackson's analysis of the Portsmouth coal is as follows :—

Water and volatile matter.....	10.00
Carbon.....	84.50
Ashes of dark red color.....	5.50

Professor Shaler's analysis of Cranston coal, is :—

Volatile matter expelled at red heat.....	3.55
Carbon.....	82.25
Ash.....	5.85
Sulphur.....	0.026
Specific gravity.....	1.839
Hygroscopic moisture.....	8.55

## THE DIFFERENT QUALITIES OF COAL.

The nomenclature used in the Final Report of the First Pennsylvania Geological Survey, in regard to the proper designation of various qualities of coal, is as follows:—

## ANTHRACITE.

Hard Anthracite, that which contains two per cent. of volatile matter.

Semi or gaseous Anthracite, that which contains ten per cent. volatile matter.

## COMMON BITUMINOUS OR COKE COALS.

Semi-Bituminous, that which contains twelve to eighteen per cent. volatile matter.

Bituminous, that which contains eighteen to forty-eight per cent. volatile matter.

## HYDROGENOUS, YIELDING NO COKE.

Cannel coal—

Hydrogenous shaly coal—Containing thirty to seventy per cent. volatile matter.

Asphaltic coal—

## COAL TRADE AT SEATTLE, W. T.

Years.	Tons.	Years.	Tons.
1871.....	4,918	1875.....	79,157
1872.....	14,830	1876.....	104,556
1873.....	13,572	1877.....	112,734
1874.....	9,027		

## DISTANCES TO MARKET.

The following are the distances from a portion of the American coal fields, to the different tide-water markets:—

FROM POTTSVILLE—	MILES.
To New York, by Schuylkill and Raritan canals.....	226
To Philadelphia by Schuylkill canal.....	106
To Philadelphia by Reading railroad .....	93
FROM MAUCH CHUNK—	
To New York by Lehigh canal.....	172
To New York by Morris canal.....	147
To Hoboken by railroad.....	126
To Philadelphia by Lehigh canal.....	124
To Philadelphia by railroad.....	89
FROM WILKESBARRE—	
To Hoboken by Lehigh Valley railroad, etc.....	192
To Philadelphia by railroad and canal.....	163
To Mauch Chunk by railroad.....	55
To Baltimore by rail and canal.....	260
To Baltimore by Penn canal and river.....	246
FROM CUMBERLAND—	
To Baltimore by Baltimore and Ohio railroad .....	173
To Georgetown by Chesapeake and Ohio canal.....	184
To Alexandria by Chesapeake and Ohio canal.....	191
Carbondale to New York, rail and canal.....	208
Scranton to Hoboken by Delaware, Lackawanna and Western railroad.....	143
Shamokin to Baltimore by rail and canal .....	200
Shamokin to Baltimore by Northern Central railroad.....	158
Broad Top to Philadelphia by Pennsylvania railroad.....	242
Clearfield to Philadelphia by Pennsylvania railroad.....	240
Westmoreland to Philadelphia by Pennsylvania railroad....	332
Blossburg to New York by Erie railroad .....	300
Kanawha to Richmond by Chesapeake and Ohio railroad.....	325

## OUTLETS TO MARKET FOR THE SHAMOKIN COAL.

To Baltimore, New York, etc., via.....	Northern Central railway.
To Philadelphia, via.....	Philadelphia and Reading railroad.
To New York, via.....	Lehigh Valley railroad.
To Erie and the Lakes, via.....	Philadelphia and Erie railroad.
To Elmira and Northern New York, via.....	Williamsport and Elmira railroad.
To Havre de Grace and the South, via.....	Pennsylvania canal

## WEST BRANCH REGION.

The Philadelphia and Erie railroad crosses the northern ends of five coal basins. There is no important development of the first two. In the third, at 67 miles west of Williamsport, is the Wistar Mountain Company's mines; at 97 miles, are the works of the Cameron Coal Company. In the fourth, at 117 miles, is St. Mary's; at 125 miles, Benzinger's; at 128 miles, the Shawmut branch road comes in. In the fifth, at 138 miles, are the Johnsonburg mines. The completion of the Buffalo, New York and Philadelphia railroad gives the coal from these basins an outlet to an additional market. During 1875, 63,348 tons, and in 1876, 50,079 tons of coal were carried by this road. The Philadelphia and Erie road carried in 1873, 81,742 tons; in 1874, 162,000 tons; in 1875, 166,978 tons; in 1876, 123,253 tons; in 1877, 156,741 tons. This includes coal used on locomotives, and is from St. Mary's, Cameron, and Daguerahonda.

## MERCER COUNTY, PENNSYLVANIA.

The most important coal region in north-west Pennsylvania, (running over into eastern Ohio), is that of Mercer county. The coal produced is what is known as the splint or block coal, and is used in the raw state for smelting iron; the principal location of this peculiar coal, is on the line of the Erie and Pittsburgh railroad. The product finds an outlet to market by this route, and also the Shenango and Allegheny, and the Jamestown and Franklin roads and their connections. The beds vary from two to five feet in thickness, and some six hundred thousand tons are annually produced. We have the following in regard to the development of coal in this county:—"The Neshannock field of coal was discovered by Mr. John Phillips, and opened by him and D. M. McMasters, and the late James Pierce, in 1864, the first coal being shipped in 1865, over the Sharpsville railroad. The shipments from this mine amount to 416,943 tons. Add the amount sold at the mine, and we have a total production of 443,553 tons. The Black Diamond shaft, owned and operated by Joseph Forker & Co., was opened into the same field of coal in 1865, and the shipments by rail commenced in 1866, 419,779 tons having been shipped from that time until its close in March, 1877; to which add bank sales, and the total production reaches 441,874 tons. The Mount Pleasant shaft was also opened in the same field, in 1869, and was owned and operated by Kimberly & Filer, who shipped by the Sharpsville railroad, from this mine, 279,251 tons, to which add five per cent. for bank sales, and the total production is 293,686 tons. This mine was exhausted, last fall."

## ANTHRACITE ON THE PACIFIC.

Anthracite coal has been found at Queen Charlotte Islands, in British Columbia, on the Pacific coast of North America. We give analyses—No. 1 being from a six-foot seam, and No. 2 being from the three-foot seam:—

	No. 1.	No. 2.
Water.....	1.60	1.89
Volatile matter.....	5.02	4.77
Fixed carbon.....	83.09	85.76
Sulphur.....	1.53	0.89
Ash.....	8.76	6.69

The mines have been abandoned on account of crushes and faults.

### ANTHRACITE IN VIRGINIA.

	Carbon.	Vol. Matter.	Water.	Ash.	Total.
Briery Branch.....	89.47	6.60	.40	4.13	100
Little Coal Run.....	89.02	6.42	.50	4.06	100

### RAILWAYS OF THE WORLD.

Great Britain.....	16,699 miles.
Europe.....	72,430 miles.
Asia.....	7,643 miles.
Africa.....	1,451 miles.
Central America, Mexico and West Indies.....	559 miles.
Canada.....	4,484 miles.
United States.. ..	79,725 miles.
South America.....	3,701 miles.
Australasia.....	1,752 miles.

### PETROLEUM PRODUCTION.

*Stowell's Petroleum Reporter*, furnishes the following statistics of the petroleum business of Pennsylvania, for the year 1877:—

New wells completed in the year.....	3,839
Daily average product of new wells.....	31 1-10 barrels.
Number of producing wells at the end of December.....	8,452
Daily average production of all wells.....	4 8-10 barrels.
Production for the year, 13,135,671 barrels. Stock on hand at end of year, 3,127,837 barrels.	

The shipments and distribution of crude and refined oils, reduced to crude, out of the oil regions, during the year 1877:—

To New York.....	5,753,678 barrels.
To Philadelphia.....	793,224 barrels.
To Baltimore.....	207,736 barrels.
To Boston.....	447,579 barrels.
To Cleveland.....	3,121,914 barrels.
To Pittsburgh.....	1,807,034 barrels.
Down the Ohio river.....	155,548 barrels.
To Local points.....	463,784 barrels.
Consumed by fire.....	83,656 barrels.
Total shipments.....	12,832,573 barrels.
Total exports, foreign.....	10,425,502 barrels.
Value of the exports.....	\$53,084,730

Production of West Virginia, Kentucky, Tennessee, Ohio and California, amounted to 354,500 barrels. Average price for the year at the creek:—*Crude*, \$2.45 per barrel; *Refined*, in New York, \$15.92 per barrel.

A barrel of oil, in above tables, is forty gallons, and a gallon of refined oil weighs four pounds.



## COAL TRAFFIC ON PENNSYLVANIA RAILROAD.

District,	Year, 1877.	Year, 1876.
Anthracite.....	694,180	687,172
East Broad Top.....	54,738	65,999
Huntington and Broad Top.....	87,905	44,461
Cumberland.....	189,394	147,512
Snow Shoe.....	42,985	50,916
Tyrone and Clearfield.....	1,340,744	1,190,418
Gallitzin and Mountain region.....	184,464	209,315
West Pennsylvania railroad.....	187,345	173,324
“ “ Coke.....	58,483	57,797
Southwest Pennsylvania railroad.....	39,010	157,150
“ “ Coke.....	635,990	539,640
Westmoreland region.....	786,039	896,590
“ “ Coke.....	64,905	59,462
Pittsburgh region.....	1,374,396	1,310,846
“ “ Coke.....	107,840	162,126
D. H. & W. Anthracite.....	94,685	95,434
Lewisburg Anthracite.....	10,789	8,863
Total in tons of 2,000 lbs.—coal.....	4,086,674	4,018,159
Total in tons of 2,000 lbs.—coke.....	867,218	819,125

## QUOTATIONS OF ANTHRACITE COAL STOCKS.

The following schedule will show the range for the Anthracite coal road stocks, at the dates given, and the extreme fluctuations during the year 1877:—

	Jan. 2, '77.	Dec. 31, '77.	Highest.	Lowest.
New Jersey Central.....	37½	12¾	37¾	5
D. L. & W.....	74¼	50½	77	30½
Morris and Essex.....	91½	76	92½	51¼
Delaware and Hudson.....	72¼	52½	74½	25½

## COAL TRADE OF UTAH.

Utah has a plentiful supply of fuel, yet the product of the coal mines for 1877, was only 10,000 tons. About 1,000 tons of coke was made from native coal. There was 47,100 tons received from Wyoming Territory, and 10,680 tons of coke from Pennsylvania.

## PROPORTIONS OF ANTHRACITE PRODUCTION.

The Anthracite production for 1878, is to be distributed by the different interests as below:—

Philadelphia and Reading Railroad.....	28.625 per cent.
Lehigh Valley Railroad.....	19.750 per cent.
Central Railroad of New Jersey.....	12.905 per cent.
Delaware, Lackawanna and Western Railroad.....	12.750 per cent.
Delaware and Hudson Canal.....	12.480 per cent.
Pennsylvania Railroad.....	7.625 per cent.
Pennsylvania Coal Company.....	5.865 per cent.

## COAL TRADE OF THE UNION.

We give below the tonnage for the year 1869, as per census reports made in 1870, together with figures for year 1877, where available, in other cases we have made a careful estimate based upon our reports of the trade in the various States—we have added 3,000,-000 tons to the Anthracite of Pennsylvania, as for local consumption and unreported business:—

	1869—tons.	1877—tons.
Pennsylvania Anthracite.....	15,610,275	23,319,911
Pennsylvania Bituminous.....	7 798,517	12,500,000
Illinois.....	2,629,563	3,500,000
Ohio.....	2,527,285	5,250,000
Maryland.....	1,819,824	1,574,339
Missouri.....	621,930	900,000
West Virginia.....	608,878	1,000,000
Indiana.....	437,870	1,000,000
Iowa.....	263,487	1,500,000
Kentucky.....	150,582	850,000
Tennessee.....	133,418	750,000
Virginia.....	61,803	90,000
Kansas.....	32,938	200,000
Oregon.....	.....	200,000
Michigan.....	21,150	30,000
California.....	.....	600,000
Rhode Island.....	14,000	14,000
Alabama.....	11,000	175,000
Nebraska.....	1,425	50,000
Wyoming.....	50,000	100,000
Washington.....	17,844	150,000
Utah.....	5,800	45,000
Colorado.....	4,500	300,000
Total.....	32,860,690	54,398,250

## STATISTICS OF BITUMINOUS AND SEMI-BITUMINOUS COAL PRODUCTION OF PENNSYLVANIA, IN 1877.

In tons of 2,000 lbs.

Blossburg.....	602,245	
Barclay.....	340,101	
McIntyre.....	183,715	
Total Northern Pennsylvania region.....		1,126,061
Broad Top.....	140,143	
East Broad Top.....	54,738	
Snow Shoe.....	42,985	
Clearfield.....	1,374,927	
Total Central Pennsylvania region.....		1,612,793
Allegheny Mountain.....	184,466	
West Pennsylvania railroad.....	263,322	
Southwest Pennsylvania railroad.....	688,003	
Westmoreland.....	872,579	
Pittsburgh.....	518,182	
Johnstown Iron Works.....	220,000	
Total on line of Pennsylvania railroad.....		2,746,552

In addition to the returns on the foregoing page, we append the business for a series of years, of roads of Pennsylvania, carrying Bituminous coal, giving the quantities as we find them, without attempting to separate coal twice reported. We omit certain roads which are Carriers, but on the line whereof no coal trade whatever originates. For instance, the Lake Shore road carries one million tons, nearly, but there are no mines on its line in Pennsylvania.

The figures represent tons of 2,000 pounds, and are compiled from the reports to the Auditor General :—

	1874.	1875.	1876.
Monongahela Navigation.....	2,503,504	2,275,265	2,495,800
Philadelphia and Erie.....	115,276	166,978	183,595
Allegheny Valley.....	458,403	710,481	754,343
Erie and Pittsburgh.....	393,055	248,307	311,946
Lawrence.....	120,009	137,762	99,907
Newcastle and Beaver.....	237,154	201,593	405,655
Saw Mill Run.....	87,085	86,452	148,654
Pittsburgh and Castle Shannon....	136,226	104,412	107,815
Pittsburgh and Connellsville .....	{ Coal, 368,829 { Coke, 560,223	448,743	416,079
		615,283	724,120
Pittsburgh, Virginia and Charleston... ..	39,096	43,890	68,796
Shenango and Allegheny Valley.....	117,052	113,481	134,993
Pittsburgh, Ft. Wayne & Chicago.....	{ Coal, 407,963 { Coke, 329,901	291,377	237,549
		329,901	393,857
McKean and Buffalo (Buffalo Coal Company).....		32,035	80,259
Pittsburgh, Cincinnati and St. Louis.....	425,344	579,589	631,282
East Broad Top.....	3,152	63,309	108,342
Buffalo, New York and Philadelphia.....	26,329	63,347	130,336
Bells Gap railroad.....	78,012	70,711	79,044
Chartiers.....	8,495	24,415	47,614
Cleveland and Pittsburgh.....	700,633	684,129	576,522
Dunkirk, Allegheny and Pittsburgh.....	81,098	132,739	130,820
Edgewood.....		24,612	27,204
Pittsburgh, Titusville and Buffalo.....			302,094
Salisbury.....			35,434
Atlantic and Great Western.....	835,390	505,176	773,803

It may be estimated that 300,000 tons are produced at Pittsburgh, that is not in any report of railroad companies. There is perhaps 500,000 tons mined at country pits, for furnaces, salt works, oil wells, etc., not in above reports.

We are informed that the Western Kentucky coal field, turned out in 1877, some 511,000 tons, as below :—

Mines on Evansville, Henderson and Nashville railroad.....	144,000 tons.
Mines on Paducah and Elizabeth railroad.....	180,000 tons.
Mines on Green river.....	75,000 tons.
Mines on Ohio river, below Green river.....	70,000 tons.
Mines between Louisville and Green river.....	42,000 tons.

The St. Bernard Coal Company shipped 180,000 tons of the above.



## NOTES ON GAS COAL.

The most important requisites of gas coal are, first, that it contains a large amount of volatile combustible matter, or gas; second, that the volatile matter be of a good illuminating power; third, that the coal be as free as possible from sulphur; and fourth, that the coke furnished by the carbonization of the coal be bulky, and at the same time firm, that is, not inclined to be granular.

1. The percentage of the volatile matter in the coals usually employed in gas-making, is from twenty-five to forty, and in cannel coal it rises to sixty or seventy per cent., a portion being nitrogen and oxygen. A ton of coal should produce from 8,000 to 9,000 feet of carburetted hydrogen or illuminating gas, or from four to four and one-half feet per pound; the latter, as is well known, being the product of fair average sample of Youghiogheny coal. Gas works, practically obtain more gas per pound than the chemists in analyzing the coal, doubtless, through the re-distillation of the tarry matter and its conversion into permanent gas. Besides this, at gas works, the measurement is taken at a high temperature, a difference of five degrees changing the volume of gas about one per cent. By using the steam-jet exhaust, (a recent improvement) an increased quality of gas is obtained, which would otherwise pass off in little bubbles in the tar.

2. That the gas produced from the coal be of good illuminating power, is also very important. The standard of gas in our large cities ranges from fourteen to sixteen candle power. The standard candle in testing gas is of spermaceti, burning at the rate of one hundred and twenty grains per hour, compared with a standard gas-burner containing five cubic feet per hour. When it is supposed to give fifteen-times the amount of light furnished by such standard candle, the gas is said to have fifteen-candle power, or be fifteen-candle gas. But the standard of illuminating power can easily be raised by the addition of a few per cent. of some rich cannel or oil shale, or some substance of the character of Albertite or Grahamite; for example, from a coal that produces by itself fifteen-candle gas, by the addition of ten per cent. of cannel, the gas was raised to the standard of eighteen candles. Many coals which produce gas of a low-illuminating standard, but in large quantities, and which coke well, are used as gas coals.

3. It is important that the coal should contain but a small proportion of sulphur compound, as it is then easily purified; requiring less lime; producing a better quality of gas, and the coal may be safely stored without danger from spontaneous combustion. Good gas coal should not require more than one bushel of lime to purify 5,000 or 6,000 feet of gas. The sulphur in coal is sometimes in combination with iron, in other cases it passes off in a volatile state, leaving but little in the coke. For gas-making, this latter is a disadvantage, as the less sulphur entering the gasses, the better, since it must be removed by purification. For the blast furnace, on the contrary, the less sulphur remaining in the coke, the better, since it is the sulphur in the coke which is injurious, and not that in the hydrocarbons, which pass off at the top of the furnace stack. In some cases, however, when the gas carries with it most of the sulphur, the gas may be so superior in illuminating power as to warrant its use, notwithstanding its increased cost of purification.

4. A ton of good coal, used in the manufacture of gas, should produce thirty-five to forty bushels of coke, weighing thirty-five pounds to the bushel. The coke is used for heating the retorts, and should burn up clean with but little clinker. There should be a surplus of coke when a large amount of gas is manufactured, besides that used in the gas house, and this is valuable to the gas manufacturer as a merchantable product, especially in localities where coal of a good quality for domestic and other purposes is expensive.

—By James Macfarlane.



## STATISTICS OF ALBERTITE.

New Brunswick, Nova Scotia, possesses a mine of a new and beautiful substance, analogous to coal, called Albertite, which is deserving of notice at least as one of the curiosities of our subject. It is situated at Hillsborough, on Peticodiac river, in Albert county, near the head of the Bay of Fundy. Albertite is used in the manufacture of oil and gas, yielding one hundred gallons of crude oil per ton, or 14,500 cubic feet of gas of superior illuminating power. It was discovered in 1849, and there were 56,289 tons of it exported to the United States in three years, from 1863 to 1865.

Unlike coal, it is found in a true vein, or filling a crevice in the rocks, and most authorities now agree in considering the substance as a variety of asphalt, or a solid hydrocarbon, originally fluid, like petroleum, and derived from the decomposition of vegetable or animal products. Formerly, it was regarded by different authors as a true coal, an asphaltic coal, and a jet. It is a new material, intermediate between the most bituminous coals and the asphalts, and is found in the lower carboniferous formations. It has a beautiful and singular appearance, having a resplendent resinous lustre, a perfect conchoidal fracture, and it is perfectly free from mineral charcoal, and lines of impure coal or earthy matter. It is, however divided into prismatic pieces by a great number of smooth, divisional planes, proceeding from wall to wall.

Albertite coal (or solidified petroleum, as it is sometimes improperly called), is also found in Ritchie county, West Virginia, where it is called Grahamite or Ritchie mineral.

According to official documents of Canada, the following are the shipments of Albertite, for the twelve years from 1863 to 1874 :—

1863.....	18,600 tons.	1869.....	17,000 tons.
1864.....	19,300 tons.	1870.....	6,000 tons.
1865.....	20,500 tons.	1871.....	5,500 tons.
1866.....	20,500 tons.	1872.....	5,000 tons.
1867.....	17,000 tons.	1873.....	6,000 tons.
1868.....	12,400 tons.	1874.....	7,000 tons.
Total.....			154,800 tons.

Calculated from the royalty paid, there were mined before the year 1863, 22,492 tons, making the total production 177,292 tons, since the discovery of the Albertite, in 1849.

The marked decrease in the amount reported since 1869, has been due partly to extensive fires in the mines, and partly to a great diminution in the size of the vein. It varies from one to fourteen feet in thickness, and is placed almost vertically in the ground. It has been mined to a depth of 1,162 feet.

## AUCTION SALE OF AUGUST 29TH, 1876.

We have been requested to include the result of the great sale in August, '76, just after the disruption of the combination.

	D. L. & W. Delivered at Hoboken.	D. & H. Delivered at Rondout.	PENN'A COAL Delivered at Newburgh.	P. & R. CO. Delivered at Williamsburg.	P. & R. CO. Delivered at Philadelphia.
Steamer....	\$2 77½	\$2 76½	\$2 72½	\$.....	\$2 11½
Grate.....	2 72½	3 35	2 63½	2 63	2 66½
Egg.....	2 78	3 18½	2 87½	2 55	2 20½
Stove.....	3 60½	3 85	3 63½	3 22½	2 71½
Chestnut...	2 77½	.....	3 26½	2 20	1 98½

## AMERICAN IRON TRADE.

*From Statistics of the American Iron and Steel Association.*

	1874.	1875.	1876.	1877.
<b>Pig Iron.—Anthracite.....</b>	1,202,144	908,046	794,578	934,797
Charcoal.....	576,557	410,990	308,649	317,843
Bituminous coal and coke.....	910,712	947,545	990,009	1,061,945
Rails of all kinds.....	729,413	702,512	879,629	764,709
Bar, angle, rod, bolt, plate, sheet, etc.....	864,538	861,524	834,211	.....
Cut nails and spikes.....	245,609	236,343	207,890	.....
Bessemer steel rails made.....	144,944	290,863	412,461	432,169
Steel, other than Bessemer.....	49,681	61,058	71,178	.....
Stock of pig iron in first hands at end of year	795,784	760,908	686,798	642,351
Probable consump. of rolled iron, except rails	1,140,312	1,116,655	1,067,111	.....
All net tons of 2,000 lbs.				

The relative condition of the blast furnaces, is shown below:—

	Whole Number Completed Furnaces, December 31.		Condition of Furnaces, on December 31.				Make of Pig Iron in tons of 2,000 pounds.	
	1876.	1877.	1876.		1877.		1876.	1877.
Anthracite.....	228	231	85	143	103	128	794,578	934,797
Charcoal.....	279	272	73	206	79	193	308,649	317,843
Bituminous.....	205	213	78	127	88	125	990,009	1,061,945
<b>Total.....</b>	<b>712</b>	<b>716</b>	<b>236</b>	<b>476</b>	<b>270</b>	<b>446</b>	<b>2,093,236</b>	<b>2,314,585</b>

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# **“AMERICAN GAS MAKING.”**

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A COMPENDIUM OF USEFUL INFORMATION RELATIVE TO  
THE PRICE CHARGED FOR GAS,  
THE QUANTITY ANNUALLY MADE,  
THE AMOUNT AND VARIETY OF COAL USED,  
—AND—  
THE CHARGE FOR PUBLIC LIGHTING, ETC.,  
THE POPULATION OF THE PRINCIPAL CITIES AND TOWNS  
—BY—  
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Editor of THE COAL TRADE JOURNAL,

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Editor of "THE COAL TRADE JOURNAL"

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**1879.**

**Published at 111 Broadway, New York.**

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**SIXTH CONSECUTIVE YEAR OF PUBLICATION.**



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# The Coal Trade.

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## INTRODUCTION.

In presenting the sixth Annual Review of the Coal Trade, at home and abroad, we find many features of interest and value to the general reader. The statistics given are more than usually full, and are brought down to the most recent dates. In the matter of coal production the United States still maintains its pre-eminent position. The future outlook is for even larger growth than the past, for many industries now show signs of revival that must become large consumers of fuel. Our returns show that the output of Great Britain ranges first, as she always must, in the list of coal producing nations; the latest yearly returns available showing a continuance of the large tonnage heretofore reported. In the aggregate we report a tonnage fully equal to former years for Pennsylvania, Ohio, and all the States of the Union; the Bituminous product increases, though the Anthracite may decline. We are indebted to many friends for figures reported, and with few exceptions they prefer the omission of their names. Our foreign reports are much improved, thanks to the efforts of Mr. John Pechar, of Bohemia, who prepared a statement for the Paris Exposition. We bespeak for the present edition, a renewal of the cordial reception awarded our previous efforts in this direction. The details are carefully gathered from the most authentic sources, and there can be no doubt of the correctness thereof.

To avoid the charge of mere repetition in order to make up a large book, we have eliminated much of the descriptive matter relating to the coal in many of the States of the Union. One description serves for all time, and those who desire information upon this particular, may find it in previous editions of this Annual.



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## ANTHRACITE COAL.

Anthracite coal is found in an area of about 470 square miles, in Luzerne, Carbon, Schuylkill, Northumberland, Dauphin, and Columbia counties, in the State of Pennsylvania.

There are three great divisions—which are named from their locations—the first or Southern, the second or Middle, and the third or Northern coal fields.

The Southern coal field lies principally in Schuylkill county, and hence it is often called the Schuylkill region.

The Mahanoy (often included in the Schuylkill) and Lehigh regions constitute the Middle coal field.

The Northern coal field is in Luzerne county, and embraces what is known as the Wyoming, Lackawanna, Scranton, and Wilkesbarre regions.

The production is largely controlled by the great carrying and mining corporations, and it is to be regretted that individual enterprises are yearly becoming less in number, in the operations of mining and shipping the product.

In the schedules which follow will be found all the necessary details of the production, of each company, presented in a form that will be appreciated, from its conciseness. It is hardly within the province of this work to criticise the management of the trade, as a whole; but, we may be pardoned for mentioning the fact, that Anthracite has been forwarded to market at a positive loss to those engaged, during the past season. From the commencement of the industry in 1820, with the shipment to market of 365 tons, it is estimated that the amount marketed is upward of as many million tons. As the area in which this quality of coal is found in the United States is limited, and the rapid and wasteful absorption of this territory, the question as to the life of our Anthracite coal field is of importance. There can be no doubt but that the ability to produce is much less than has been calculated by many persons—thirty million tons—and that before many years, the Anthracite will be sufficiently appreciated, to command a better price than has ruled within a few years past. Many well informed persons prophesy that before ten years shall have passed Anthracite will be a luxury; the dependence as a source of steam supply, will perforce be found in Bituminous coals. It is only necessary to bear in mind that at least twenty per cent. of the amount brought to the surface is wasted at the breakers, to find that the amount extracted in the coming ten years, may equal that of the fifty that have passed; since this coal was first marketed.

It may be of interest, to state that of the total amount of Anthracite annually reported as marketed, there is somewhat less than one half that arrives at the tide-water shipping ports; the remainder being distributed by rail and water to interior points, North, South and West, for consumption. The trade in Anthracite is increasing largely in the West; it is not saying too much, to remark that from this direction will come a demand that will make itself felt upon the supply; manufactures and population are increasing in this portion of our Union to such an extent.

## THE DELAWARE, LACKAWANNA AND WESTERN R. R. CO.

YEAR.	TONS.	YEAR.	TONS.	YEAR.	TONS.
1854.....	133,965	1863.....	1,223,165	1872.....	2,836,948
1855.....	187,000	1864.....	1,302,457	1873.....	3,136,306
1856.....	305,530	1865.....	1,007,074	1874.....	2,570,437
1857.....	490,023	1866.....	1,519,538	1875.....	3,326,901
1858.....	683,411	1867.....	1,719,321	1876.....	2,300,500
1859.....	829,435	1868.....	1,728,785	1877.....	2,320,636
1860.....	1,080,227	1869.....	1,563,923	1878.....	2,439,111
1861.....	1,104,319	1870.....	2,348,097		
1862.....	1,094,315	1871.....	1,916,486		

Tons are stated at 2,000 lbs.

## PENNSYLVANIA COAL COMPANY.

YEAR.	TONS.	YEAR.	TONS.	YEAR.	TONS.
1850.....	111,014	1860.....	701,523	1870.....	1,086,008
1851.....	316,017	1861.....	629,657	1871.....	802,039
1852.....	426,164	1862.....	601,091	1872.....	1,213,478
1853.....	512,659	1863.....	662,904	1873.....	1,239,214
1854.....	496,648	1864.....	759,544	1874.....	1,338,663
1855.....	504,803	1865.....	577,494	1875.....	1,363,207
1856.....	612,500	1866.....	535,385	1876.....	1,086,475
1857.....	536,008	1867.....	861,730	1877.....	1,064,583
1858.....	630,056	1868.....	953,855	1878.....	925,991
1859.....	688,854	1869.....	966,637		

Tons are stated at 2,240 lbs.

## DELAWARE AND HUDSON CANAL COMPANY.

This company began mining and carrying coal in 1829.

YEAR.	TONS.	YEAR.	TONS.
1829.....	7,000	1872.....	2,930,761
1830 to 1839.....	846,330	1873.....	2,752,595
1840 to 1849.....	2,897,881	1874.....	2,399,417
1850 to 1859.....	4,838,855	1875.....	3,053,817
1860 to 1869.....	10,098,661	1876.....	1,997,545
1870.....	2,039,722	1877.....	1,929,248
1871.....	1,866,474	1878.....	2,137,201

Tons are stated at 2,240 lbs.

## SHIPMENTS OF SHAMOKIN COAL.

1873—East via Philadelphia and Reading railroad.....	699,156 12 tons.
“ East via Lehigh Valley railroad.....	59,316 02 tons.
“ West via Northern Central railroad.....	585,781 06 tons.
“ Sold at mines.....	18,000 00 tons.
“ Consumed at breakers.....	90,000 00 tons.

Total for 1873.....1,452,254 00 tons.  
 Compared with 1877.....1,776,163 00 tons.

Tons of 2,240 lbs.

## PHILADELPHIA AND READING RAILROAD COMPANY.

YEAR.	TONS.	YEAR.	TONS.	YEAR.	TONS.
1850.....	1,351,502	1860.....	1,946,195	1870.....	4,633,504
1851.....	1,650,270	1861.....	1,639,535	1871.....	6,002,573
1852.....	1,650,912	1862.....	2,310,990	1872.....	6,185,434
1853.....	1,532,243	1863.....	3,065,261	1873.....	6,546,555
1854.....	1,937,854	1864.....	3,065,577	1874.....	6,348,812
1855.....	2,213,292	1865.....	3,090,814	1875.....	5,505,455
1856.....	2,038,903	1866.....	3,714,634	1876.....	5,595,207
1857.....	1,709,692	1867.....	3,446,826	1877.....	7,255,318
1858.....	1,542,646	1868.....	4,574,874	1878.....	5,909,140
1859.....	1,632,932	1869.....	4,239,457		

Year ends November 30th. Tons are 2,240 lbs.

The coal carried over main line and branches was distributed as follows :

Year.	Line.	Philadelphia.	Port Richmond.
1863.....	548,755 tons.	388,352 tons.	2,128,154 tons.
1864.....	634,074 tons.	373,070 tons.	2,058,423 tons.
1865.....	659,376 tons.	330,283 tons.	2,051,202 tons.
1866.....	836,593 tons.	475,189 tons.	2,402,897 tons.
1867.....	935,694 tons.	336,933 tons.	2,121,189 tons.
1868.....	697,903 tons.	697,277 tons.	2,113,531 tons.
1869.....	923,504 tons.	888,633 tons.	2,362,972 tons.
1870.....	1,074,400 tons.	785,535 tons.	1,893,055 tons.
1871.....	1,128,227 tons.	923,539 tons.	2,311,393 tons.
1872.....	1,357,203 tons.	998,212 tons.	2,223,137 tons.
1873.....	1,670,188 tons.	1,075,255 tons.	2,266,892 tons.
1874.....	1,715,052 tons.	1,064,304 tons.	2,076,259 tons.
1875.....	1,197,449 tons.	923,850 tons.	1,713,978 tons.
1876.....	1,444,780 tons.	914,831 tons.	1,770,523 tons.
1877.....	1,429,510 tons.	1,022,726 tons.	2,825,101 tons.
1878.....	1,446,764 tons.	953,040 tons.	2,086,115 tons.

Details of the company's business for the fiscal year ending November 30, 1878 :

	Paying Freight.	For Company's Use.
Received at Port Carbon.....	1,494,542 tons.	119,790 tons.
Received at Mount Carbon.....	60,680 tons.	11,671 tons.
Received at Schuylkill Haven.....	1,448,702 tons.	152,180 tons.
Received at Pine Grove .....	490,285 tons.	7,425 tons.
Received at Tamaqua .....	460,106 tons.	54,389 tons.
Wyoming and Lehigh coal.....	362,875 tons.	..... tons.
Bituminous coal.....	174,727 tons.	3,144 tons.
Carried by canal.....	680,719 tons.	..... tons.
Shipped Westward, via Catawissa, etc .....	286,784 tons.	18,490 tons.
Consumed on Laterals.....	82,626 tons.	..... tons.
Total tonnage for the year.....	5,542,049 tons.	367,090 tons.

## LEHIGH VALLEY RAILROAD CO.

Statement of the total coal tonnage, together with the tonnage east of Mauch Chunk, from year 1855 to date:—

Year.	East of Mauch Chunk.	Total coal to do.	Year.	East of Mauch Chunk.	Total coal tonnage.
1855 (3 mo.).....	8,482	8,482	1867.....	1,948,385	2,080,156
1856.....	165,740	165,740	1868.....	2,225,630	2,608,102
1857.....	418,235	418,235	1869.....	2,015,295	2,310,170
1858.....	471,029	471,029	1870.....	2,810,020	3,608,586
1859.....	577,651	577,651	1871.....	2,210,272	2,889,074
1860.....	730,641	730,641	1872.....	3,009,395	3,850,118
1861.....	743,671	743,671	1873.....	3,189,023	4,144,339
1862.....	882,573	882,573	1874.....	3,016,636	4,150,659
1863.....	1,195,154	1,195,154	1875.....	2,417,800	3,277,571
1864.....	1,295,419	1,466,794	1876.....	3,129,895	3,951,513
1865.....	1,402,276	1,687,452	1877.....	3,453,533	4,362,124
1866.....	1,730,474	2,037,714	1878.....	2,758,756	3,446,615

The sources of this company's business are as follows:

FROM	TONS—1878.	TONS—1877.
Wyoming region.....	919,712	1,031,777
Hazleton region.....	1,520,049	2,121,353
Upper Lehigh region.....	943	609
Beaver Meadow region.....	435,951	577,462
Mauch Chunk region.....	4,123	6,099
Mahanoy region.....	565,826	624,738
Total, in tons of 2,240 lbs.....	3,446,615	4,362,124

The year ends with November 30.

## CENTRAL RAILROAD OF NEW JERSEY.

Amount of coal carried over the Lehigh and Susquehanna Railroad since its opening:—

YEAR.	TONS.	YEAR.	TONS.
1868.....	1,058,054	1874.....	2,972,286
1869.....	1,297,825	1875.....	2,661,635
1870.....	1,354,052	1876.....	2,952,520
1871.....	1,033,587	1877.....	2,969,788
1872.....	2,527,063	1878.....	2,390,655
1873.....	3,089,697		

The distribution last year was as follows in tons of 2,240 lbs.

Forwarded east by rail to tidal points.....	1,371,952 tons.
Forwarded east by rail to local points.....	502,843 tons.
Forwarded east by rail for use of company.....	102,247 tons.
Delivered at and above Mauch Chunk.....	59,130 tons.
Delivered to Coalport and Hazard for canal.....	301,217 tons.
Delivered to Lehigh Valley Railroad.....	53,265 tons.



## PHILADELPHIA AND READING COAL AND IRON CO.

The coal produced from the lands owned by the company during the years 1873-78, is shown below, together with the reported average cost of coal in cars at the mines, of the Philadelphia and Reading Coal and Iron Company.

	Leases produced.	P. & R. C. & I. Co. produced.	Average cost at mines.
1873.....	2,055,565 tons.	1,348,838 tons.	\$2.51 per ton.
1874.....	1,802,370 tons.	1,374,790 tons.	2.45 per ton.
1875.....	1,594,741 tons.	1,510,572 tons.	1.87 per ton.
1876.....	1,218,533 tons.	1,853,364 tons.	1.85 per ton.
1877.....	1,389,108 tons.	3,794,528 tons.	1.04 per ton.
1878.....	1,100,181 tons.	2,727,608 tons.	1.24 per ton.

The ton used is that of 2,240 lbs. The figures for 1876 are for eleven months, to November 30.

## LEHIGH AND WILKESBARRE COAL CO.

1874.....	2,479,382 tons.	1877.....	2,196,864 tons.
1875.....	2,085,083 tons.	1878.....	1,201,486 tons.
1876.....	2,300,555 tons.		

## PENNSYLVANIA AND NEW YORK R. R.

This line is an important feeder to the Lehigh Valley Railroad, for its business to the north and west. In addition thereto, it transports a large amount of Bituminous coal from what is known as the "Barclay" region. A comparison of tonnage for fiscal year ending November 30th last is appended.

Anthracite.....	In 1878—780,796 tons.	In 1877—911,754 tons.
Bituminous.....	In 1878—314,567 tons.	In 1877—340,501 tons.

## SCHUYLKILL CANAL COAL TRADE—1878.

Carried through to Philadelphia.....	328,528 tons.
Passed through to Delaware and Raritan Canal.....	222,688 tons.
Delivered to local points.....	112,898 tons.
Passed through to Chesapeake and Delaware Canal.....	25,604 tons.

## PENNSYLVANIA R. R.—BELVIDERE DIVISION.

This line forms an important feeder to the Anthracite roads centering at Phillipsburg, N. J. The sources of supply and distribution are clearly given below:—

From Lehigh region.....	In 1878—573,757 tons.	In 1877—698,949 tons.
From Wyoming region.....	In 1878—155,043 tons.	In 1877—204,681 tons.
	Tons 1878.	Tons 1877.
Distributed to Coalport for shipment.....	14,233	60,689
Distributed to South Amboy for shipment.....	430,578	564,515
Distribution to local points for consumption.....	199,656	206,522
Coal for Company's use.....	84,332	71,903

MINERAL R. R. & MINING CO.

The production of Anthracite coal at the mines of this company during the year 1878, is given below ; these collieries are in the Shamokin region, and the Pennsylvania Railroad Co., are the land owners.

Cameron, 159,700 tons ; Luke Fidler, 103,299 tons ; Hickory Ridge, 21,472 tons,

SUMMIT BRANCH R. R. CO.

The production of Anthracite coal at the mines of this company in 1878, was 255,010 tons from the Summit Branch colliery, and 107,740 tons from the Short Mountain colliery. Pennsylvania Railroad control this company.

LEHIGH COAL AND NAVIGATION CO.

YEAR.	TONS.	YEAR.	TONS.
1872.....	566,724	1876.....	606,773
1873.....	525,623	1877.....	550,519
1874.....	572,470	1878.....	430,987
1875.....	397,427		

This company dates back to 1820, as a mining and carrying company. The figures in the schedule above, are the figures of the production at the 'Summit mines'.

AGGREGATE ANTHRACITE TONNAGE—1878.

Mr. JOHN H. JONES, furnishes the following statement of the output for last year.

	Allotment for 1878.	Total pro- duction.	Percentage of actual product.
Philadelphia and Reading.....	5,152,500	5,101,044 11	29.472
Lehigh Valley Railroad.....	3,555,000	3,398,717 02	19.644
Central Railroad of New Jersey.....	2,372,900	2,263,300 03	13.076
Delaware, Lackawanna & Western R. R.	2,295,000	2,180,672 12	12.599
Delaware and Hudson Canal.....	2,246,400	2,045,040 13	11.816
Pennsylvania Railroad.....	1,372,500	1,362,673 13	7.873
Pennsylvania Coal Company.....	1,055,700	955,461 15	5.520
Totals.....	18,000,000	17,306,910 09	100.—

Total tonnage for 1878, as above..... 17,306,910 09 tons.  
Add shipments to foreign points and Pacific coast of U. S..... 20,219 02 tons.  
Add coal mined by Erie Railway interest..... 278,132 07 tons.

Grand total, production for 1878..... 17,605,261 18 tons.

Shipments from the three sub-divisions of the Anthracite coal field for a series of years:—

Years.	Schuylkill.	Wyoming.	Lehigh.	Totals.
1864.....	2,642,218	3,960,836	2,054,669	10,177,475
1865.....	3,735,802	3,256,638	1,822,535	9,652,991
1866.....	4,633,487	3,736,616	2,128,867	12,703,882
1867.....	4,334,820	5,328,312	2,062,446	12,988,725
1868.....	4,414,356	5,990,813	2,507,582	13,834,126
1869.....	4,748,960	6,068,365	1,929,583	13,723,030
1870.....	3,720,403	7,599,902	3,040,303	15,349,899
1871.....	5,124,780	6,481,171	2,249,356	15,113,407
1872.....	5,106,451	9,194,808	3,610,674	19,026,125
1873.....	5,209,156	10,047,241	3,243,168	19,585,178
1874.....	5,891,666	9,445,446	4,404,000	18,980,726
1875.....	6,337,700	10,269,743	3,467,944	20,075,287

We append comparative details of the Anthracite business, for the calendar years named, in tons of 2,240 lbs. It must be borne in mind that these figures represent the amount carried to market by the several routes, and not the quantity used and sold at the mines:—

By	LEHIGH.	1878.	1877.	1876.
Lehigh Valley road .....		2,500,000	3,355,612	2,872,211
Central railroad of New Jersey.....		1,313,000	1,563,992	1,467,937
Delaware & Hudson Branch of Pa.....		33,500	35,000	41,736

By	WYOMING.		
Delaware & Hudson Co.....	2,137,202	1,929,248	2,006,509
Delaware, Lackawanna & Western Railroad Co.....	2,180,672	2,072,000	2,054,019
Pennsylvania Coal Co.....	925,991	1,064,583	1,036,475
Central Railroad of New Jersey.....	950,000	1,393,416	1,422,279
Lehigh Valley Railroad.....	867,217	905,699	964,100
Pennsylvania & New York Railroad.....	31,500	42,617	26,862
Pennsylvania Canal.....	347,599	340,231	407,522

By	SCHUYLKILL.		
Philadelphia & Reading.....	5,101,044	6,835,244	4,935,401
Shamokin.....	693,781	766,594	587,274
Williamstown, etc. ....	362,750	315,675	564,342

Totals.....	17,449,256	20,619,911	18,436,667
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During the early part of the year 1878, a combination of the several companies was formed for the purpose of regulating the product, so that a better price might result. It is fair to assume that there was nearly five million tons of Anthracite, on hand at the opening of the years business, due to the unusually mild winter of 1877—78; by the restrictions in tonnage this was overcome, but the prices were not profitable to the companies on the result of the years traffic. The fluctuations are shown in the schedules given on another page. The cheapest term was at the close of the year, when the continuance of the combination into 1879, became impossible.

The Anthracite production for 1878, under the agreement entered into, was to have been distributed to the different interests as below :—

Philadelphia and Reading Railroad.....	28,625 per cent.
Lehigh Valley Railroad .....	19,750 per cent.
Central Railroad of New Jersey.....	12,905 per cent.
Delaware, Lackawanna and Western Railroad.....	12,750 per cent.
Delaware and Hudson Canal.....	12,490 per cent.
Pennsylvania Railroad.....	7,625 per cent.
Pennsylvania Coal Company.....	5,865 per cent.

The actual tonnage produced, was as below :—

	1878.	1877.	Difference.
Philadelphia and Reading Railroad Company.....	5,101,044 11	6,842,105	1,741,060 09
Lehigh Valley Railroad Company.....	3,398,717 02	4,511,331	1,112,613 18
Central Railroad of New Jersey .....	2,263,300 03	2,837,500	574,199 17
Delaware, Lackawanna and Western Railroad Co....	2,180,672 12	2,089,523	+91,149 12
Delaware and Hudson Canal Company.....	2,045,040 13	1,918,617	+126,423 13
Pennsylvania Railroad Company.....	1,362,673 13	1,530,594	167,920 07
Pennsylvania Coal Company.....	955,461 15	1,118,011	162,549 05
	<hr/>	<hr/>	<hr/>
	17,306,910 09	20,847,681	Dec. 3,540,770 11

From statistics prepared by J. H. Jones, accountant to the Board of Control, we take the following statement :—

Companies.	Five years 1868-72.		Five years 1873-77.	
	Tons.	Per Cent.	Tons.	Per Cent.
Philadelphia and Reading Railroad Company.....	24,207,937	30.55	27,993,619	27.84
Lehigh Valley Railroad Company.....	15,261,052	19.26	20,151,995	20.04
Central Railroad of New Jersey.....	8,444,928	10.67	13,485,624	13.41
Delaware, Lackawanna and Western Railroad Co.	9,284,638	11.72	12,326,239	12.26
Delaware and Hudson Canal Company.....	10,878,434	13.72	12,121,992	12.06
Pennsylvania Railroad Company.....	5,874,290	7.42	8,083,833	8.04
Pennsylvania Coal Company.....	5,276,927	6.66	6,382,240	6.35
	<hr/>	<hr/>	<hr/>	<hr/>
	79,228,146	100.00	100,550,542	100.00

Business during the year 1877, divided into Local and Competitive :—

Companies.	Local.	Competitive.	Total.
Philadelphia and Reading Railroad Company.....	4,143,596	2,698,509	6,842,105
Lehigh Valley Railroad Company.....	2,928,520	1,582,811	4,511,331
Central Railroad of New Jersey.....	1,161,254	1,676,246	2,837,500
Delaware, Lackawanna and Western Railroad Company.....	924,917	1,164,606	2,089,523
Delaware and Hudson Canal Company.....	825,496	1,093,121	1,918,617
Pennsylvania Railroad Company.....			1,530,594
Pennsylvania Coal Company.....	306,070	811,941	1,118,011



## RECORD OF THE AUCTION SALES, 1878.—Delivered at HOBOKEN, N. J.

Date of sale.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
January 30.....	\$3 09	\$3 12½	\$3 15	\$3 57	\$3 10½
February 27.....	3 11½	3 07½	3 15½	3 55	3 00
March 27.....	3 25	3 22	3 40	3 69	3 18
May 1.....	3 30½	3 30	3 45	3 77	3 15
May 29.....	3 42½	3 45	3 56	3 76	3 25
June 26.....	3 47½	3 48½	3 58½	3 89	3 25
July 31.....		3 48	3 59	3 90	3 22½
August 23.....		3 52½	3 66½	3 98½	3 37½
September 25.....		3 56	3 68	4 07½	3 52½
October 30.....	3 46	3 57½	3 67½	4 05	3 32½
November 26.....	3 20	3 23	3 23½	3 71½	3 07½
December 18.....	2 44	2 55	2 67½	2 98	2 42½

## LEHIGH VALLEY COAL CO., 1878.—Delivered at PERTH AMBOY, N. J.

	Lump.	Broken.	Egg.	Stove.	Chestnut.
January.....	\$3 75	\$3 50	\$3 70	\$3 75	\$3 25
February.....	3 75	3 50	3 50	3 75	3 25
March.....	3 75	3 50	3 50	3 75	3 25
April.....	4 00	3 75	3 75	3 90	3 25
May.....	4 00	3 75	3 75	3 90	3 25
June.....	4 00	3 75	3 75	3 90	3 25
July.....	4 10	3 90	3 90	4 10	3 50
August.....	4 10	3 90	3 90	4 10	3 50
September.....	4 10	3 90	3 90	4 10	3 50
October.....	4 10	3 90	3 90	4 10	3 50
November (average market).....	3 85	3 75	3 75	3 85	3 20
December (average market).....	3 75	3 50	3 50	3 50	3 00

## PENNSYLVANIA COAL CO., 1878.—Delivered at NEWBURGH, N. Y.

	Lump.	Broken.	Egg.	Stove.	Chestnut.
January.....	\$3 25	\$3 25	\$3 35	\$3 75	\$3 50
February.....	3 25	3 25	3 35	3 75	3 50
March.....	3 35	3 35	3 45	3 75	3 10
April.....	3 35	3 35	3 45	3 75	3 10
May.....	3 35	3 35	3 45	3 75	3 10
June.....	3 45	3 45	3 60	4 00	3 45
July.....	3 45	3 45	3 60	4 05	3 50
August.....	3 50	3 55	3 75	4 05	3 50
September.....	3 55	3 65	3 75	4 05	3 50
October.....	3 55	3 65	3 75	4 05	3 50
November.....	3 55	3 65—3 30	3 75—3 30	4 05—3 85	3 50—3 40
December.....		3 30	3 30	3 85	3 40

January and February, at Weehawken, N. J.

## WILKESBARRE COAL AND IRON CO., 1878.—Delivered at PORT JOHNSTON, N. J.

	Lump.	Broken.	Egg.	Stove.	Chestnut.
January.....	\$3 25	\$3 25	\$3 35	\$3 75	\$3 25
February.....	3 25	3 25	3 35	3 75	3 25
March.....	3 50	3 50	3 60	3 90	3 25
April.....	3 50	3 50	3 60	3 90	3 25
May.....	3 50	3 50	3 60	3 90	3 25
June.....	3 60	3 60	3 75	4 20	3 60
July.....	3 60	3 60	3 75	4 20	3 60
August.....	3 60	3 70	3 85	4 20	3 60
September.....	3 60	3 70	3 85	4 20	3 60
October.....	3 60	3 70	3 85	4 20	3 60
November.....	3 60—3 35	3 70—3 40	3 85—3 45	4 20—3 90	3 60—3 30
December.....	3 35	3 40	3 45	3 90	3 30

## PENNSYLVANIA.

## NORTHERN PENNSYLVANIA SEMI-BITUMINOUS COAL FIELD.

The first coal from the Blossburg district, in this coal field, was sent to market from the "Bloss" mines in 1840. The railway from the mines connects with the Erie railway at Corning, N. Y., the New York Central railway at Geneva and Lyons, thus affording outlets to market, by these railways and their connections, for the coal from this region.

Since the opening of the mines of the Blossburg district, in 1840, the shipments by each company have been as follows :

Arbon Coal Company, 1840-1843.....	49,633 net tons.
Wm. M. Mallory, 1844-1857.....	405,113 net tons.
D. S. Magee, 1856-59.....	78,996 net tons.
Tioga Transportation Company.....	323,174 net tons.
Salt Company of Onondaga, 1863-1866.....	267,909 net tons.
Morris Run Coal Company, 1864-1878.....	3,921,648 net tons.
Fall Brook Coal Company, 1860-1878.....	3,592,313 net tons.
Blossburg Coal Company, 1866-1878.....	2,249,674 net tons.

Total production of the district.....10,938,343 net tons.

Details of this production are given below :

YEAR.	TONS.	YEAR.	TONS.	YEAR.	TONS.
1840.....	4,235	1853.....	45,507	1866.....	411,759
1841.....	25,966	1854.....	70,214	1867.....	481,318
1842.....	13,164	1855.....	73,204	1868.....	602,328
1843.....	6,268	1856.....	70,669	1869.....	715,094
1844.....	14,234	1857.....	94,314	1870.....	733,035
1845.....	29,836	1858.....	41,894	1871.....	815,079
1846.....	16,509	1859.....	48,393	1872.....	849,262
1847.....	29,807	1860.....	76,918	1873.....	991,057
1848.....	33,763	1861.....	112,713	1874.....	796,388
1849.....	32,095	1862.....	179,334	1875.....	581,732
1850.....	23,161	1863.....	235,843	1876.....	616,984
1851.....	25,000	1864.....	334,977	1877.....	602,245
1852.....	20,000	1865.....	394,642	1878.....	652,597

The McIntyre Coal Co., whose mines are at Ralston, Pa., on the Northern Central Railway (54 miles south from Elmira, N. Y.,) which gives them an outlet both north and south to a market, commenced operations in 1870. Statistics of their business are as below :—

YEAR.	TONS.	YEAR.	TONS.
1870.....	17,802	1875.....	164,507
1871.....	106,133	1876.....	203,701
1872.....	171,420	1877.....	183,715
1873.....	212,462	1878.....	154,205
1874.....	138,907		

The Barclay district is located in Bradford county, Pa., some thirty-six miles south from Waverly, N. Y. The mines now operated are those of the Towanda Coal Company, and the Schraeder Coal Company. The outlet to market is via the Sullivan and Erie Railroad and its connections. Details are given below of the production of coal in the district since its inception :

*The Barclay Coal Company—1856-1867.*

YEAR.	TONS.	YEAR.	TONS.	YEAR.	TONS.
1856 .....	2,295	1860 .....	27,718	1864 .....	62,058
1857 .....	6,265	1861 .....	40,835	1865 .....	48,375
1858 .....	17,560	1862 .....	52,779	1866 .....	37,968
1859 .....	30,143	1863 .....	54,535	1867 .....	30,119

Year.	Towanda Coal Co.	Fall Creek Coal Co.	Schraeder Coal Co.
1865 .....	7,886	16,936	.....
1866 .....	31,881	29,604	.....
1867 .....	27,668	16,953	.....
1868 .....	67,080	6,595	.....
1869 .....	176,597	4,303	.....
1870 .....	196,310	77,025	.....
1871 .....	249,240	129,095	.....
1872 .....	263,960	118,882	.....
1873 .....	252,329	85,315	.....
1874 .....	215,572	21,281	100,219
1875 .....	200,424	18,507	157,686
1876 .....	160,343	.....	200,795
1877 .....	164,344	.....	175,755
1878 .....	165,035	.....	149,285

**BROAD TOP SEMI-BITUMINOUS COAL FIELD.**

The area of this coal field is stated at eighty square miles, the larger seams range from five to ten feet in thickness, and the lesser from one to three.

An outlet for the coal from the region is afforded by the Huntingdon and Broad Top Mountain Railroad (this was completed in 1856, and the during the latter part of that year 42,000 tons were forwarded from this region to various markets.) The line extends from the town of Huntingdon, on the Pennsylvania Railroad 203 miles west of Philadelphia, to Mt. Dallas in Bedford county, a distance of 45 miles. At Saxton, 24 miles from Huntingdon, a branch road, 10 miles in length, extends to Broad Top City; at Riddlesburg, 5 miles beyond Saxton, is a branch in to Fulton, 5 miles from the main road.

From Mt. Dallas the Bedford and Bridgeport Railroad, 38<sup>6</sup>-10 miles in length, extends to the Maryland State line; from this point to Cumberland, Md., via the Cumberland and Piedmont Railroad, is 7 miles. The connection gives an outlet to the Cumberland coal to the interior markets of Pennsylvania, to Philadelphia and South Amboy, N. J. The Bedford and Bridgeport road is leased to the Pennsylvania Railroad and operated by them.

The yearly shipments from this region, by the H. & B. T. R. R., have been as follows :

YEAR.	TONS.	YEAR.	TONS.	YEAR.	TONS.
1856 .....	42,000	1864 .....	386,645	1872 .....	297,473
1857 .....	78,813	1865 .....	315,906	1873 .....	350,245
1858 .....	105,473	1866 .....	265,720	1874 .....	226,693
1859 .....	130,595	1867 .....	244,412	1875 .....	204,921
1860 .....	186,903	1868 .....	280,936	1876 .....	159,779
1861 .....	272,625	1869 .....	360,778	1877 .....	140,143
1862 .....	333,606	1870 .....	313,425	1878 .....	150,224
1863 .....	305,673	1871 .....	319,625		

The East Broad Top railroad penetrated this coal field in 1875, and delivered to the Pennsylvania R. R. 53,567 tons of coal during that year, 66,104 in 1876; 54,738 in 1877, and 63,068 in 1878. In addition some 60,000 tons were last year used in the furnaces on the line of the E. B. T. road.

The shipments of Cumberland coal over the Pennsylvania State line, and Huntingdon & Broad Top railroad, have been as below :—

YEAR.	TONS.	YEAR.	TONS.
1872.....	22,021	1876.....	145,796
1873.....	114,589	1877.....	187,498
1874.....	67,671	1878.....	163,598
1875.....	175,154		

#### SNOW SHOE SEMI-BITUMINOUS COAL FIELD.

This region is located in Centre county, Pennsylvania. It covers an area of about eight miles in length, and some four miles in breadth, and is situated on both sides of Beach Creek. The coal finds an outlet to market, via the Bellefonte and Snowshoe, and Bald Eagle Valley connections of the Pennsylvania Railroad; it being 47 miles from Snowshoe to Tyrone, on the main line.

There is but one company mining in this district. It commenced operations in the year 1862, with 8,260 tons, and has increased as below :—

YEAR.	TONS.	YEAR.	TONS.
1862.....	8,260	1871.....	79,984
1863.....	12,039	1872.....	68,988
1864.....	23,593	1873.....	95,257
1865.....	51,881	1874.....	63,540
1866.....	70,890	1875.....	62,423
1867.....	68,137	1876.....	51,399
1868.....	60,149	1877.....	42,985
1869.....	89,356	1878.....	29,168
1870.....	85,276		

Prof. Rogers gives this Snowshoe coal 78.8 of Fixed Carbon, and 21.2 of volatile Matter and Ashes.

#### SONMAN REGION.

This district is in Cambria county; the coal is worked in the same vein that is mined in Clearfield county; the coal here has a heavier cover than where found in the adjoining county of Clearfield; is strong, and partakes somewhat of the nature of the gas coal found in Westmoreland county, which adjoins it on the southwest; the trade has increased during the past three years, shipments having been made to all tide water ports—to New England, Baltimore, Chicago, Cleveland, etc., at the west, and along the line of the Pennsylvania railroad; it has not only maintained its place, but gained in favor.

An analysis made of Sonman vein White Ash coal, by Dr. C. M. Cresson, gave the following results, as compared with Broad Top and Westmoreland :—

	Sonman.	Broad Top.	Westmoreland.
Volatile matter.....	18.30	17.85	32.85
Fixed carbon.....	78.60	74.65	61.45
Ash.....	2.70	7.50	5.80
Sulphur.....	0.40	1.85	1.04

The ash consists of alumina, silica and lime. Does not produce clinker. The yield of coke showed 82.30 per cent.; taking the Penn coal at 1,000 as the standard for steam purposes, Sonman coal is equivalent to 959.

Details of production are included in returns of Allegheny region of Pennsylvania railroad report.



## MYERSDALE (SOMERSET) REGION.

This district is located in Somerset county, Pennsylvania, adjoining the Cumberland region, of Maryland, and the coal is stated to be similar to, and an extension of the Cumberland coal basin. The coal is of the same quality and will yield a similar quantity per acre. It is eleven miles from Frostburg, Md., and the coal finds an outlet to Baltimore and the seaboard markets over the Pittsburgh and Connellsville branch of the Baltimore and Ohio railroad. The Keystone Coal Company have been at work here since 1872, and built up a business amounting to 69,313 tons in 1877, (56,273 tons in 1878.) The property of the company is advantageously situated for the shipment of its production, and the rate of transportation from the mines to market is very favorable. The Cumberland and Elk Lick Coal Company own 1,500 acres of land in this district, and during 1876 sent to market some 39,919 tons, which was, increased to 79,363 tons in 1877 and decreased to 42,444 tons in 1878.

Myersdale may be stated as the centre of the district ; it is 217 miles from Baltimore, and 112 miles from Pittsburgh, by present routes.

The first coal seam rests on a thin floor of fire clay. The coal bed has two benches ; the lower, 18 inches thick, is an impure Cannel coal, circling to block structure ; the upper is a medium quality of semi-Bituminous coal with the well-marked columnar structure peculiar to Allegheny coals.

The interval between this and the next small coal seam is composed of thin plates of sandstone with olive-colored shales.

The second workable seam (B) is pre-eminently the *bed* of the lower system of coal measures ; not perhaps, so much from its size and good quality of coal, as from its ready and sure identification, wherever it exists, by the massive bed of limestone on which it rests.

The coal in this bed is columnar in structure with plates of mineral charcoal disseminated. In structure and quality it is closely associated with the best Clearfield coal. It will be found a superior fuel for iron working.

The third seam (C) is all pure coal of an excellent quality ; but as the bed is high in the measures and does not occupy a wide area in this portion of the field, it has as yet received little attention.

From seam (B), to the top of the scale, the measures are composed of very soft flesh and olive-colored shales, which have been rounded and softened into easy rolling slopes and rounded hills.

During the past year considerable attention has been attracted to this region, and in addition to the quantity mined by the two companies above mentioned, there was perhaps 25,000 tons mined by other parties. With proper railroad facilities for reaching the markets of the East and West, a large business will be done. We look for an increase this year, inasmuch as the Pennsylvania Railroad company will no doubt have finished a connection from this region to Johnstown on the main line. Capital has been invested very largely in this important region, and the coal being of good quality, only requires the railway service at equitable rates to be productive.

## THE COAL TRADE.

### CLEARFIELD REGION.

This coal field is located in Clearfield and Centre counties, in the central portion of the State of Pennsylvania; for an outlet for the products of its mines it is dependent upon the Tyrone and Clearfield branch of the Pennsylvania railroad, extending from Tyrone on the main line, (224 miles west from Philadelphia), to Clearfield, 41 miles. The Pennsylvania Railroad Company owns the railroads, the shipping wharves, and all the means of access to the markets of the Atlantic seaboard; the advantage of being connected with a railroad of such magnitude, with its wonderful ramifications and connections, gives the coal proprietors of this region great facilities for the proper conduct of their business, and it is owing to the very liberal policy of this corporation, that the district has been enabled to take the rank which it has assumed, in connection with the fuel supply of the seaboard. The figures given of the production, show that the market for this quality of coal has steadily increased, while other districts fell off; its introduction having been most successful during the years 1876-8.

Statistics of the product from the beginning are as below, in tons of 2000 lbs.:

In the year 1867.....	169,219 tons.	In the year 1873.....	592,860 tons.
In the year 1868.....	171,288 tons.	In the year 1874.....	639,680 tons.
In the year 1869.....	259,994 tons.	In the year 1875.....	928,297 tons.
In the year 1870.....	379,868 tons.	In the year 1876.....	1,281,861 tons.
In the year 1871.....	542,896 tons.	In the year 1877.....	1,374,927 tons.
In the year 1872.....	431,915 tons.	In the year 1878.....	1,295,201 tons.

The coal measures are found to be admirably adapted for working, dipping gently toward the Moshannon creek, which flows through the centre of the basin. The lowest seam of coal (A), five feet thick, crops out on the level of this stream. The next, (B), sixty feet above, is three to four feet in thickness. Fifty feet above is another seam, (C), ranging from two to three and a half feet in thickness. Again, fifty feet above, is found a seam, (D), of five feet of good solid coal.

The report of the Geological Survey, gives the coals of this region an exceptional character for purity and freedom from sulphur. The coal is used for steam purposes under stationary, marine, or locomotive engines, for making iron and steel rails, for glass works, in lime kilns, and many other purposes, being much liked wherever used; ignites freely, burns readily, and leaves a white ash. It is not easily friable, and bears transportation remarkably well.

"The analysis of Clearfield coal shows an average of about 70 per cent. carbon, and 22 per cent. volatile matter, leaving eight per cent. water, sulphur and ash. The highest percentage of carbon, as per table of analysis made by Geological Survey, is 74.284, found by analysis of Franklin coal. One of the tables, however, makes an exception in favor of Moshannon colliery, giving a carbon percentage of 74.779 but with an excess of water, ash, and sulphur. The new Moshannon coal shows, by the same table, 71.199 per cent. of carbon, with a high percentage of volatile matter.

The low percentage of impurities, ash and sulphur, is an indication of the value of Clearfield coal. The Eureka, Penn, Franklin, Sterling, Morrisdale, Logan, Beaver, Ocean, and Moshannon coals, all stand high for steam and blacksmith purposes. The amount of volatile combustible matter and fixed carbon, less the ash and sulphur, is the working force, and these coals carry full ninety per cent. The Geological report classes them as truly Bituminous.

Taking everything into consideration, the future outlook for this region is very bright and promising.

## THE COAL TRADE.

### JEFFERSON COUNTY, PA.

The various coal openings in the vicinity of Reynoldsville are embraced in the northeastern boundary of the Reynoldsville coal basin. The vein of coal opened in this immediate region is designated as the lower Freeport bed, and varies in thickness from 5 to 8 feet, while that of the upper Freeport bed is opened in but few places near the center of the basin, showing a thickness of about 5 feet. These two veins are included in the middle measures, and are above water level. The lower measures embrace the vein opened at Fullers Station, which is from 6 to 8 feet in thickness, and in the southwestern part of the basin is one hundred and twenty feet below water level, as demonstrated near Punxsutawney several years ago by a practical test. The following analyses show its quality :—

Constituents.	Diamond Colliery.		Hover Opening.	
	Coal.	Coke.	Coal.	Coke.
Water .....	1.120	.500	1.100	.780
Volatile Matter.....	33.860	1.150	32.900	1.420
Fixed Carbon.....	60.692	88.478	62.174	88.950
Sulphur.....	1.278	1.022	.726	.900
Ash.....	3.050	8.850	3.100	7.950

The coal from this region has been placed in the market in comparatively small quantities, and with the difficulties which usually arise from strong competition; but wherever it has had a trial, its record has been of such a character as to warrant an increased demand. With the railroad connections to Buffalo, Pittsburgh, etc., there is a grand future awaiting this section of the State.

### MERCER COUNTY, PA.

The most important coal region in northwest Pennsylvania, (running over into Eastern Ohio), is that of Mercer county. The coal produced is what is known as the splint or block coal, and is used in the raw state for smelting iron; the principal location of this peculiar coal, is on the line of the Erie and Pittsburgh railroad. The product finds an outlet to market by this route, and also the Shenango and Allegheny, and the Jamestown and Franklin roads and their connections. The beds vary from two to five feet in thickness, and some six hundred thousand tons are annually produced. We are furnished with the following statistics of the coal carried over the Sharpsville Railroad, and its destination, by Walter Pierce, Esq. The figures express tons of 2,000 pounds :—

In 1865.....	105,701	In 1872.....	265,257
In 1866.....	141,399	In 1873.....	330,148
In 1867.....	179,007	In 1874.....	243,965
In 1868.....	192,464	In 1875*.....	90,094
In 1869.....	325,841	In 1876.....	230,684
In 1870.....	304,669	In 1877.....	239,031
In 1871.....	355,613	In 1878.....	192,766

\*Miners' strike lasting nine months in this year, is the reason for the small tonnage. Four per cent. may be added for local sales.

The distribution of this total production was as below :—

	Tons.
Sharpsville, consumed by furnaces and railroad.....	719,273
Other points in Shenango Valley.....	477,000
Bank sales.....	133,184
Erie, and points north of Sharpsville via Erie & Pittsburgh railroad.....	1,808,768
Erie, and points north of Sharpsville via Erie & Beaver canal.....	191,608



## MONONGAHELA REGION.

By means of its slack-water navigation, the Monongahela river is made navigable at all seasons of the year, and boats carrying eight hundred tons are passed down. The city of Pittsburgh is supplied mainly by railroad, and the larger portion of the coal by river, is run down the Ohio and Mississippi to the lower markets. The following statement of shipments by the slack-water navigation, from 1845 to date, is of interest:—

YEAR.	*TONS.	YEAR.	*TONS.
1845 .....	184,200	1863 .....	743,358
1846 .....	311,156	1863 .....	1,134,150
1847 .....	385,805	1864 .....	1,402,823
1848 .....	392,774	1865 .....	1,580,791
1849 .....	398,340	1866 .....	1,704,212
1850 .....	491,918	1867 .....	1,202,908
1851 .....	490,850	1868 .....	1,812,040
1852 .....	585,233	1869 .....	2,100,504
1853 .....	628,654	1870 .....	2,303,856
1854 .....	693,278	1871 .....	1,944,852
1855 .....	889,360	1872 .....	2,291,220
1856 .....	353,364	1873 .....	2,094,312
1857 .....	1,155,939	1874 .....	2,503,504
1858 .....	1,027,866	1875 .....	2,275,265
1859 .....	1,131,467	1876 .....	2,495,800
1860 .....	1,517,909	1877 .....	2,677,460
1861 .....	834,630	1878 .....	2,797,530

\*We have estimated 25 bushels, of 80 lbs., to the ton of 2000 lbs.

The business done by the various railroads, entering or passing through this coal field, is indicated by the fact that in 1878, the Pennsylvania Railroad carried upwards of 1,429,428 tons from this district. In this connection, the cost of transporting coals over waterways, as from Pittsburgh to New Orleans, is of value. The distance is something like 2000 miles, the rate is about  $3\frac{3}{4}$  cents per bushel, or \$1.05 per ton of 2240 lbs.; the ordinary time being about two weeks, when all circumstances are favorable. From Pittsburgh to Louisville, Ky., the distance is six hundred miles; the cost  $1\frac{3}{4}$  cents per bushel, including return of empty craft; and the time five days. Coke forms a considerable item in the business from this region. Some 129,000 tons were shipped last year. It weighs 40 lbs. to the bushel, and  $62\frac{1}{2}$  lbs. of coke represents 100 lbs. of coal, so that of the total product of this region in 1878—1,548,428 tons was sent out by rail.

## Mc KEAN COUNTY, PA.

In the southern part of Mc Kean county, in what is known as the fifth coal basin, is an important coal district, which from its vicinity to the Buffalo and Rochester markets, is entitled to our attention and notice.

No other coal basin contains so large a body of coal, at its northern extremity as this, owing probably to its being situated on the dividing waters, where the work of denudation has been less destructive. The Mc Kean and Buffalo railroad, which extends from Larrabees, on the Buffalo, New York and Philadelphia railroad, to Smethport, a distance of twenty-two and one-half miles, gives an outlet for the coal from this district; the distance from Smethport being but one hundred and eight miles to Buffalo, and one hundred and fifty to Rochester.

Analyses and practical tests of considerable quantities of this coal, under stationary and locomotive boilers, indicate that it is a good quality of Bituminous coal, with excellent steam generating qualities. A company known as the "Buffalo Coal Company," is develop-



ing this region. The product last year was about 80,000 tons. We give the following analyses of three samples, from the Pennsylvania Geological Survey Report of 1875 :

Water.....	1.130	1.300	1.170
Volatile matter.....	33.090	39.830	35.440
Fixed Carbon.....	53.006	52.063	43,992
Sulphur.....	1.874	1.727	1.708
Ash.....	10.900	5.080	17.090

## WESTMORELAND REGION.

The celebrated Penn and Westmoreland Gas coal is mined near Penn and Irwin stations, on the Pennsylvania railroad, in Westmoreland county ; the distance from Philadelphia is 332 miles. The coal mined is the great Pittsburgh bed of Bituminous coal; the companies operating in this region are large and influential, among them being the Penn Gas Coal Company, and the Westmoreland Gas Coal Company. The coal is used in every seaboard city for gas purposes, and always commands the highest price; in fact it makes the rate for all other gas-producing coal that reaches the seaboard. The shipping points are South Amboy, N. J., and Greenwich, (on the Delaware river) below Philadelphia. Shipments have been as follows :—

YEARS.	TONS.	YEARS.	TONS.
1874.....	952,971	1877.....	786,039
1875.....	796,963	1878.....	692,586
1876.....	902,139		

This coal is in great favor among gas engineers in the United States.

In the dry way, by the ordinary process, the Westmoreland coal yields on an average sample as follows :—

Charge, 224 pounds, carbonized 3 h. 20 m., produced .....	9,500 cubic ft.
Illuminating power, standard Argand.....	16.52 candles
Weight of coke, per ton.....	1,544 pounds.
Bushels of coke, per ton.....	40
Maximum yield of gas, per ton.....	10,642 cubic ft.
One bushel of lime purified.....	6,420 cubic ft.

### ANALYSIS OF THE COAL.

Volatile matter.....	36 per cent.
Fixed carbon .....	58 per cent.
Ash .....	6 per cent.
Value of the gas from one ton estimated in pounds of spermaceti.....	541.26 pounds.

## WEST BRANCH REGION.

The Philadelphia and Erie Railroad crosses the northern end of five coal basins. There is no important development of the first two. In the third, at 67 miles west of Williamsport, is the Wistar Mountain Company's mines; at 97 miles, are the works of the Cameron Coal Company. In the fourth, at 117 miles, is St. Mary's; at 123 miles, Benzinger's; at 128 miles, the Shawmut branch road comes in. In the fifth, at 138 miles, are the Johnsonburg mines. The completion of the Buffalo, New York and Philadelphia railroad gives the coal from these basins an outlet to an additional market. During 1875, 63,348 tons; in 1876, 50,079 tons and in 1877, 130,336 tons of coal were carried by this road. The Philadelphia and Erie road carried in 1873, 81,742 tons; in 1874, 162,000 tons; in 1875, 166,978 tons; in 1876, 123,253 tons; in 1877, 156,741 tons. This includes coal used on locomotives, and is from St. Mary's, Cameron, and Daguseahonda. We are without the returns for 1878, but the output has largely increased.

## THE CONNELLSVILLE COKE REGION.

Of the coking coal fields of the United States, the one which enjoys the most enviable reputation is the Connellsville. It is situated in the southwestern part of the State of Pennsylvania, lying mainly in the counties of Westmoreland and Fayette, and some 50 to 60 miles from Pittsburgh. The field occupies a triangle some three miles wide and fifty miles long, almost without a fault, the beds yielding from 8 to 9 feet of workable coal.

The continuation of the Pittsburgh area of the bed with the Connellsville area is broken off by the Youghiogheny, the bed taking an upward course and descending again, the intermediate portion being swept away. This has led to a popular belief that the bed at Connellsville is different from the bed at Pittsburgh, but careful surveys have established their identity. It is a fact, however, that at Pittsburgh this bed is not in its best condition, while at Connellsville it is at its largest size and finest quality. In the Connellsville basin, the coal ranges from 8 to 11 feet in thickness, with one small slate parting the "bearing in slate" 18 inches above the floor. The roof is only passable; rooms can only be run 12 feet wide, and the pillars left will average 10 feet, a large amount of which is lost in drawing. The floor is even and quiet, and the coal of a remarkably good and uniform character, soft and easily mined.

The coal is Bituminous, with generally a dull resinous luster, alternating with seams of bright, shining crystalline coal, coated with a yellowish silt. It contains numerous particles of slate, and some crystals of pyrites. It is compact, with a tendency to break up into cubes. Such a coal, from the mines of Messrs. H. C. Frick & Co., at Broad Ford, is taken by the Pennsylvania Geological Survey as the typical coal of the Connellsville basin.

The coke from this region is of silvery lustre, cellular, with a metallic ring, tenacious, comparatively free from impurities, and capable of bearing a heavy burden in the furnace. Its porosity and ability to "stand up" in the furnace are what have given it such a reputation for a blast furnace fuel, and has created such demand for it for mixing with Anthracite and Bituminous coal in the East and West, especially where an open iron, such as is used in the Bessemer process, is needed.

In coking the coal, the beehive oven is in universal use in the Connellsville region. These ovens vary, at the different works, from 11 to 12 feet in diameter, and from 5 to 6 feet in height. The working is very simple. The coal is dumped through an opening in the crown of the furnace, and spread evenly on the floor, to the average depth of 2 feet for 48-hour coke and  $2\frac{1}{2}$  feet for 72-hour. The front opening, through which the coke is discharged, is at first nearly closed with brick, luted with loam. The heat of the oven from the previous coking fires the charge, and as the coking progresses, the air is more and more shut off by luting the openings, and finally closing the roof openings. The average charge is 100 bushels of coal at 76 lbs., and the yield in coke, 120 bushels at 40 lbs., making the percentage yield 63, or 1.6 tons of coal to 1 ton of coke. The average time of coking is 48-hours, with 72-hours for that burned over Sunday; 24-hour coke is sometimes made. The 72-hour coke is firmer coke than either of the others, but it is questionable whether it is a better furnace coke. When the coke is thoroughly burned the door is removed, and the coke is cooled by water thrown in from a hose and then drawn.

The statistics of this trade are surprising. The manufacture began in the winter of 1841-2. According to the latest information we have, there are 3668 ovens in the Connellsville region, and nearly all are in operation. Annual output at present is about 1,500,000 tons.

## WEST VIRGINIA GAS COAL.

That class of gas coal known in the New York and Eastern markets as "West Virginia Gas Coal," is mined in Marion, Taylor, Ritchie and Preston counties, West Virginia, the mines being located near to or upon the main line of the Baltimore and Ohio railway. The coal is used for gas making in the cities of the seaboard, and is very favorably spoken of. The distances to Baltimore are as follows :—From Clarksburg 301 miles ; from Fairmount, 302 miles ; from Newburg, 263 miles ; from Tunnelton, 260 miles ; from Cario, 355 miles.

The veins are from six to eleven feet in thickness. Analyses of these coals have given the following results :—

	Volatile matter.	Fixed carbon.	Ash.
Clarksburg, main seam .....	56.74	41.66	1.60
Clarksburg Cannel.....	49.21	45.43	5.36

The trade to the seaboard began in the year 1868, with 165,772 tons and the following schedule shows the yearly business to Baltimore :

YEAR.	TONS.	YEAR.	TONS.
1868.....	165,772	1873.....	190,673
1869.....	269,158	1874.....	131,703
1870.....	249,879	1875.....	177,316
1871.....	189,763	1876.....	127,293
1872.....	217,569	1877.....	103,035

In addition to the outlet eastward via Baltimore and Ohio railroad, there is the Parkersburg route due west, crossing the Monongahela river at Clarksburg, and thence to the Ohio river at Parkersburg ; and the Wheeling route northwestward, crossing the Monongahela at Fairmount, thence down the creek to the Ohio, and thence up the river to Wheeling. Both these branches enter the main coal measures near the crossing of the Monongahela above named, and traverse them to the Ohio. At Clarksburg and northward, down the Valley of the Monongahela, is one of the richest coal regions of West Virginia. One of the beds in the neighborhood of this town measures from ten to twelve feet in thickness, with a thinner bed of more highly Bituminous nature underlying ; from some distance above Clarksburg, they may be followed with scarcely an interruption throughout the whole Valley of Monongahela, northward to Pittsburgh. The improvement of the navigation of this river would enable large quantities of this truly valuable coal to be shipped to the markets of the West and Southwest.

The diminution of the trade in this coal to the seaboard, is the cheaper gas coal furnished from Great Britain and the Provinces, due to the low water freights. The introduction of coal from the Kanawha district, and the discriminating policy of the Baltimore and Ohio road, have also affected this region.

## THE CUMBERLAND REGION.

The Cumberland (George's Creek) coal field, located in Alleghany county, at the western extremity of the State of Maryland, supplies an important proportion of the semi-Bituminous coal, reaching the seaboard markets. The connections with the tide-water markets are :—via the Baltimore and Ohio railroad, from the town of Cumberland 178 miles, and Piedmont, 206



miles west from Baltimore. The Chesapeake and Ohio canal, following the Potomac river to Georgetown, 184 miles, and Alexandria, 191 miles from Cumberland. The boats carry 110 tons, and make the trip in four to five days. Steam canal boats have been introduced on this waterway with considerable success, in point of time and economy of movement. The canal is owned by the State, and is managed by a Board of Public Works.

The mines of the George's Creek coal field are located near to, or upon the line of the Cumberland and Pennsylvania branch road, extending through the region say, one and one-half to twenty miles from Piedmont, and from eleven to thirty-three miles from Cumberland. The mines are with one exception, (the Borden shaft) drift openings in the hillside; the coal being let down inclined planes, ranging from 300 to 2,000 feet in length, to the main railroad, which follows the descent of the stream towards Piedmont.

Of the quality of the production of the mines in this district, it is almost unnecessary to speak. It is of superior quality, and has stood the test for thirty-five years. The seam of coal worked is known to be fourteen feet in thickness; its full extent is seldom taken out, however, from various causes.

Labor in this region has always been well remunerated and there was no reduction in the price of mining the coal, from 1866, up to 1877, while on the other hand, the price of coal at the shipping points fell off about one-half within that period of time. We append a few statistics in this connection, showing the changes that have occurred:—

*Rates per ton paid for digging in rooms, in Cumberland region.*

1855—June, 35 cents, at which rate it remained until August, when it was reduced to 30 cents.

1856—January, to May 1862, 30 cents.

1862—In June advanced to 40 cents, and in September to 45 cents.

1863—January, to March 1864, 50 cents.

1864—In April advanced to 60 cents, and in June to 75 cents.

1864—September, to May 1865, \$1.00

1865—In June, reduced to 75 cents, at which it continued to May, 1866.

1866—May, to January 1877, it was reduced to 65 cents.

1877—In January, reduced to 50 cents; advanced in August to 55 cents.

1878—March, 40 cents.

In the year 1842 the product of this coal field was shipped to tide-water market over the Baltimore and Ohio railroad. The Chesapeake and Ohio canal was finished to Cumberland, Md., in 1850.

In the fall of the year 1872, there was built a line from the Pennsylvania railroad to tap the Cumberland and Pennsylvania road, the connection being made at or near Mt. Savage.

The total business in this district since the beginning, in 1842, to the end of 1878, foots up 33,770,199 tons, divided as below:—

Baltimore and Ohio railroad.....	21,664,162 tons.
Chesapeake and Ohio canal.....	11,292,444 tons.
Pennsylvania railroad.....	813,593 tons.



The following tables will show the business that has been done from this region:—

*Forwarded by Baltimore and Ohio Railroad.*

YEAR.	TONS.	YEAR.	TONS.	YEAR.	TONS.
1842.....	1,708	1855.....	478,486	1867.....	735,669
1843.....	10,082	1856.....	502,330	1868.....	848,118
1844.....	14,890	1857.....	465,912	1869.....	1,230,518
1845.....	24,653	1858.....	395,405	1870.....	1,112,938
1846.....	29,795	1859.....	426,512	1871.....	1,494,814
1847.....	52,940	1860.....	493,031	1872.....	1,617,947
1848.....	79,571	1861.....	172,075	1873.....	1,780,710
1849.....	142,449	1862.....	218,950	1874.....	1,576,160
1850.....	192,806	1863.....	531,553	1875.....	1,802,237
1851.....	174,701	1864.....	399,354	1876.....	1,070,775
1852.....	268,459	1865.....	560,293	1877.....	818,459
1853.....	376,219	1866.....	736,153	1878.....	924,254
1854.....	503,836				

*Forwarded by Chesapeake and Ohio Canal.*

YEAR.	TONS.	YEAR.	TONS.	YEAR.	TONS.
1850.....	4,042	1860.....	295,878	1870.....	604,137
1851.....	82,978	1861.....	97,599	1871.....	850,339
1852.....	65,719	1862.....	98,684	1872.....	616,103
1853.....	157,760	1863.....	216,792	1873.....	778,802
1854.....	155,845	1864.....	258,642	1874.....	767,064
1855.....	183,786	1865.....	343,202	1875.....	879,838
1856.....	204,120	1866.....	343,178	1876.....	632,440
1857.....	116,574	1867.....	458,153	1877.....	584,996
1858.....	254,251	1868.....	482,325	1878.....	609,204
1859.....	297,842	1869.....	652,151		

*Forwarded over Pennsylvania State Line Branch.*

YEAR.	TONS.	YEAR.	TONS.
1872.....	22,021	1876.....	131,866
1873.....	114,589	1877.....	170,884
1874.....	67,671	1878.....	145,864
1875.....	160,698		

The shipments of Georges' Creek Cumberland coal for the year 1878, show an increase ; which in face of the continued manufacturing depression that existed and the constant opposition of the low priced Anthracite, is a remarkable exhibit, and betokens increased knowledge of the profit to be derived from the use of Bituminous coal for steam purposes. This year, if the signs of the times are to be relied upon, there will be a still further increase in the production and consumption of this valuable fuel. Prices have ruled low, and the average may be set down at \$2.80 at Alexandria and Georgetown, \$2.90 @ \$3.00 at Baltimore, and \$4.25 at New York. The business done via the Chesapeake and Ohio canal is an increased one, and but for several damaging breaks during the season, would have been larger ; at least one month's time was taken out of the boating season from this cause. Coastwise freights from Georgetown favored the shippers of coal from this region, and enabled them to place supplies in the Eastern market at attractive prices. The financial result of the year's business was very unsatisfactory for with one exception no dividend was declared by any company operating in this region. The Consolidation Coal Company supply the Baltimore and Ohio, and the Cumberland and Pennsylvania Railroads, (170,000 tons,) and therefore do the largest tonnage, but other companies do a larger tide-water business.

The following statement shows the production of each company, operating in this region during the years 1876-78:—

Company.	Tons in 1878.	Tons in 1877.	Tons in 1876.
Consolidation.....	404,015	348,385	356,817
New Central .....	352,848	346,038	241,218
George's Creek Coal and Iron Company.....	87,910	121,553	198,796
Atlantic and George's Creek.....	79,778	96,211	149,930
Borden .....	121,383	97,907	145,812
American .....	105,538	117,434	127,942
Hampshire and Baltimore.....	119,476	91,516	196,204
Maryland.....	120,311	120,543	77,295
Swanton .....	37,620	49,096	67,196
Franklin.....	134,481	45,220	64,012
George's Creek Mining.....	.....	1,725	61,885
Potomac .....	56,256	63,659	58,326
Blæen Avon.....	28,304	33,769	43,288
Piedmont.....	27,189	35,796	36,601
North Branch.....	520	.....	7,108
New Reading.....	.....	.....	1,606
George's Creek Valley.....	56	1,125	1,039
Canton .....	.....	1,212	.....
Union Mining Company.....	3,637	3,220	.....
<b>Totals.....</b>	<b>1,679,322</b>	<b>1,574,339</b>	<b>1,835,081</b>

#### RECAPITULATION OF DISTRIBUTION FOR 1878.

	To B. & O. Railroad.	To C. & O. Canal.	To P. R. R.	Local.
From Cumberland and Penn. R. R.....	788,900	486,038	145,864	34,901
From Cumberland Branch.....	93,140	123,166	.....	6,315
West Virginia Mines.....	998	.....	.....	.. ..
<b>Total .....</b>	<b>883,038</b>	<b>609,204</b>	<b>145,864</b>	<b>41,216</b>

the tonnage credited to B. & O. R. R. there is included 151,890 tons used by the company in locomotives, rolling mills, etc.

## THE KANAWHA (W. VA.) REGION.

The coal measures of West Virginia underlay nearly sixteen thousand square miles of territory, of which, what are known as the Kanawha and New River Valleys, traversed by the Chesapeake & Ohio railroad, hold eight thousand. Several varieties of coal occur, among which are :—Cannel, Splint, Gas, and Bituminous. Of the Bituminous there are seams of different degrees of hardness and texture, from the friable coking coal similar to the best Newcastle (England) coals, to the harder Splint coals, with regular cleavage similar to the Youghiogheny coals so largely in demand in our Western and Southern cities ; of so compact a nature that it can be used in the blast-furnace in its raw state.

The Bituminous coals are excellent steam raising fuels, and have been used on steamers, railways, and under stationary engines with good results. The Gas coal seam is productive of a most excellent quality of coal that has been used in both the Eastern and Western markets with most satisfactory results.

The value and importance of the Kanawha coal district, as a source of supply from which good caking coals can be obtained, is beginning to be understood and appreciated by gas manufacturers.

These coals have established a high reputation where they have been tested and used, for the quantity, purity and illuminating power of the gas which they produce.

A series of practical tests, made in the apparatus of a gas light company, from ordinary average samples, of one ton (2,240 lbs.) each from five different mines, and with the regular working charges of 224 lbs., as observed and certified by Professor P. de P. Ricketts, of the School of Mines, of New York, gave the following average results per ton of 2,240 lbs., viz :

	Cubic Feet.	Candle Power.
Standard Yield.....	10,000	17.41
Maximum Yield....	12,428	16.01

Coke, 33 4-5 bushels, weighing 1,518 3-10 lbs, and of good quality.

The chemical analyses of the above five samples, by Professor Ricketts, give the following average results, viz :

Volatile Matter.....	35.75 per cent.
Fixed Carbon.....	56.65 per cent.
Ash.....	5.18 per cent.
Sulphur.....	1.32 per cent.
Moisture.....	1.08 per cent.
Specific Gravity.....	1.279
Weight of one cubic foot.....	79.78 lbs.

The capacity of the mines from which gas coals are now being shipped, is of such magnitude that the supply can be steadily increased.

An analysis of the Cannelton Cannel, made by the Manhattan Gas Light Co., of New York, gave—Volatile matter, 58.0 ; fixed carbon, 23.5 ; ash, 18.5. At standard (10,000 cubic feet) it gave an illuminating power of 64.54 candles, or 12.025 cubic feet of 45.60 candles. Weight of 32 bushels of coke, 1320 pounds.

The coke made from coal in the New River region, on the line of the Chesapeake and Ohio Railroad has a good reputation. We append analyses :

Quality.	Fixed Carbon.	Ash.	Sulphur.
Nuttallburg.....	91.22	7.53	0.92
Sewell .....	93.00	6.73	0.27
Quinnimont, No. 1.....	93.85	5.85	0.30
do. No 2.....	91.72	5.09	0.43

## CINCINNATI, OHIO.

The coal received at this city includes Youghiogeny, from the neighborhood of Pittsburgh, Pa., the Pomeroy from the vicinity of Pomeroy, Ohio; Hocking Valley, Ohio; Muskingum, Ohio; Ohio river; the Kanawha from West Virginia, including the Splint, Bituminous and Cannel, and the Anthracite from Pennsylvania.

The shipments of coal from this city to interior towns amounted to 4,973,300 bushels in 1877-78, against 5,138,700 in 1876-7.

The following table will show the number of bushels of coal of all kinds, received at Cincinnati, for the years named:—

YEARS.	BUSHEL.	YEARS.	BUSHEL.
1853-54.....	8,158,000	1866-67.....	18,446,226
1854-55.....	10,356,000	1867-68.....	17,500,000
1855-56.....	7,500,000	1868-69.....	25,500,000
1856-57.....	14,500,000	1869-70.....	30,300,000
1857-58.....	15,000,000	1870-71.....	22,972,000
1858-59.....	12,392,701	1871-72.....	30,790,796
1859-60.....	14,600,000	1872-73.....	37,274,497
1860-61.....	12,500,000	1873-74.....	35,234,834
1861-62.....	8,500,000	1874-75.....	35,360,300
1862-63.....	8,000,000	1875-76.....	40,183,317
1863-64.....	15,975,366	1876-77.....	39,622,634
1864-65.....	16,467,023	1877-78.....	33,892,229
1865-66.....	18,022,990		

It is safe to calculate the bushel at eighty pounds, which would give twenty-eight to the ton of 2,240 lbs.

## DETAILS FOR THE SEASON 1877-78.

	BUSHEL.
Pittsburgh or Youghiogeny, by river.....	26,743,055
Ohio River.....	3,288,008
Kanawha River.....	6,767,391
Muskingum and Hocking, by rail.....	1,570,241
Anthracite, by rail.....	523,534

The demand for Anthracite coal is steadily increasing under the stimulation of low prices consequent on cheap freight rates. The price for Wilkesbarre and Lehigh coal, delivered, ranged during most of the year at \$7.50 to \$8.00. In the latter part of the period the price declined to \$6.50 to \$7.50. The price for these coals ranged during most of the year, at wholesale from \$6.00 to \$7.00. The average quotation, delivered, was \$7.58 per ton, compared with \$8.33 in the preceding year.

The business in coke has been about the same with the previous year, with the exception of the crushed, which is steadily growing in favor, and the consumption of which has sensibly increased. Larger quantities of the crushed coke have gone to the country than usual.

Pittsburgh coal averaged 7.86 cents per bushel; Ashland, 6.12 cents; Ohio River, 5.82 cents; Hocking Valley, 9.3 cents; Cannel, 13 cents. The season ends with August 31st. We are indebted to Col. S. D. Maxwell for data, incorporated above.



## BOSTON, MASS.

The receipts are shown below :—

From	Tons—1875.	Tons—1876	Tons—1877.	Tons—1878.
Alexandria, Virginia.....	97,697	49,643	77,956	36,408
Georgetown, District of Columbia.....	20,567	12,945	10,150	58,046
Philadelphia, Pennsylvania.....	623,245	639,643	696,837	732,449
Baltimore, Maryland.....	168,798	151,118	157,553	173,432
Other places (New York, etc.).....	290,271	294,221	272,781	304,469
*Great Britain.....	2,738	6,177	22,952	18,823
*Nova Scotia.....	29,706	26,451	36,330	20,260
Total.....	1,233,022	1,180,204	1,274,559	1,343,887

The receipts of foreign and domestic coal at this port have been :—

Years.	Foreign.	Domestic.	Years.	Foreign.	Domestic.
1878.....	39,083	1,304,804	1870.....	115,022	819,890
1877.....	59,282	1,215,277	1869.....	110,466	764,017
1876.....	32,628	1,147,576	1868.....	103,901	742,481
1875.....	32,444	1,200,578	1867.....	117,440	680,221
1874.....	51,438	1,125,516	1866.....	159,380	676,376
1873.....	87,700	1,076,673	1865.....	209,225	538,917
1872.....	90,739	1,063,781	1864.....	188,786	516,665
1871.....	109,013	822,808	1863.....	180,445	539,921

These figures include all the coal arriving at this port for the home trade, and for the points reached by railroads centering here.

The following are the highest and lowest prices for Anthracite and Provincial coal, for the years named, as per statistics of the *Commercial List* :—

Years.	Anthracite.	Nova Scotia.
1878.....	\$5.00@ \$6.50	\$4.00@ \$4.25
1877.....	4.50 7.00	4.25 5.00
1876.....	6.00 8.25	4.75 6.00
1875.....	7.00 9.00	5.25 6.25
1874.....	7.00 9.00	5.75 7.75
1873.....	8.00 10.00	7.00 9.00
1872.....	7.00 10.00	6.00 8.50
1871.....	7.00 10.00	5.75 7.00

\*This coal is mainly for gas-making.

The quantity stated as from Georgetown is very small, and does not correctly represent the shipments thence; many vessels report to the customs that they cleared at Alexandria, and their cargo is therefore credited as shipped from thence. Large quantities of Newcastle coal from England were placed in the Eastern market during the past year or two. From what we can gather this will not be the case in the present season.

## BALTIMORE, MD.

At this city there is an extensive business in coal, both Anthracite and Bituminous. Locust Point, the terminus of the Baltimore and Ohio Railroad, on the environs of this fine city, is the shipping point for the Bituminous coal from the Cumberland region of Maryland, the Gas coal regions of West Virginia, the Somerset county mines, and the Youghiogheny Gas coal of Pennsylvania.

The trade in Anthracite at present is entirely local, none being shipped from Baltimore to other and more distant points. It is received by the following named routes: By Northern Central Railway from Millersburg, Pa., 112 miles, the Lykens Valley Red Ash. By the same route from Sunbury, Pa., 138 miles, the White Ash. By Susquehanna tide-water canal, coal from the Wyoming Valley. Schuylkill from Philadelphia, via river and canal. All the sales are 2,240 pounds to the ton. Anthracite sold as high as \$13.50 per ton for lump coal, in May, 1865.

The shipments of Bituminous coal, foreign, were as below:—

YEAR.	TONS.	YEAR.	TONS.
1871.....	20,207	1875....	33,460
1872.....	54,363	1876.....	27,336
1873.....	59,546	1877.....	27,189
1874.....	70,675	1878.....	32,504

The Northern Central railroad carried the following Anthracite:—

YEAR.	TONS.	YEAR.	TONS.
1872 .....	244,757	1876 .....	263,954
1873 .....	242,754	1877 .....	343,936
1874 .....	232,938	1878 .....	310,042
1875 .....	276,784		

The Pennsylvania railroad began to carry the Bituminous coal from the Clearfield region of Pennsylvania, to Baltimore, in 1875, by its Northern Central line, (to Canton), and there has been considerable local and shipping business for this quality of coal, developed in this vicinity.

The business of the Baltimore and Ohio Railroad, for the fiscal year, Sept. 30th, 1878, was 1,129,387 tons on main stem, exclusive of 353,689 tons for company's use. The Pittsburgh division carried 1,363,061 tons of coal and coke. The trans-Ohio lines 216,998 tons. The total was 3,063,135 tons, as against 2,871,919 tons the previous year.

The range in price of Cumberland coal at this port is as stated below:—

1870.....	\$4.72	1873.....	\$4.85	1876 .....	\$3.93
1871.....	4.72	1874.....	4.63	1877.....	3.34
1872.....	4.66	1875.....	4.42	1878.....	3.00

## SAN FRANCISCO, CAL.

The statements given below will serve to indicate the increased consumption of the several varieties of coal at San Francisco. The principal sources of supply are, from Mt. Diablo, in the immediate vicinity; from Coos Bay and Bellingham Bay in Oregon; and Seattle in Washington Territory; from Vancouver Island; from Australia and Great Britain; as also Cumberland and Anthracite, from the Atlantic coast; coal has also been received in small quantities from Chili, Sitka, Alaska and Japan, while the domestic sources of supply are constantly on the increase as the schedules show:—

Years.	Total Receipts.	Years.	Total Receipts.
1860.....	77,635	1870.....	320,493
1861.....	116,245	1871.....	315,194
1862.....	120,545	1872.....	434,467
1863.....	135,550	1873.....	454,582
1864.....	167,298	1874.....	531,947
1865.....	150,147	1875.....	538,209
1866.....	192,601	1876.....	648,888
1867.....	248,925	1877.....	576,760
1868.....	282,025	1878.....	626,834
1869.....	328,973		

Details of business for the years 1876—1878 are as below:—

FOREIGN.	Tons.—1876.	Tons.—1877.	Tons.—1878.
Australian.....	181,695	100,513	131,678
English.....	121,948	89,362	44,005
Vancouver Island.....	100,965	102,421	140,323
Chili.....	3,150	8,145	.....
DOMESTIC.			
Mount Diablo.....	108,078	96,172	122,034
Coos Bay. . . . .	41,286	30,941	35,124
Bellingham Bay .....	21,335	10,475	2,820
Seattle .....	95,314	102,333	116,008
Rocky Mountain.....	226	133	371
Ione, California.....	.....	3,458	765
Ounalaska.....	.....	190	450
Buckeye.. .....	.....	41	.....
Carbondale, California.....	.....	177	4,022
EASTERN.			
Cumberland.....	12,520	21,791	8,069
Anthracite .....	11,871	10,608	21,964
Making the total of.....	648,388	576,760	626,834

The ton weight is that of 2,240 lbs.

The Australian and Vancouvers, of the foreign source of supply, grows, while the British is falling off; the local supplies are also increasing very largely; the coals from the Atlantic coast do not hold their own, considerable of the Anthracite received was started during the low range of prices in the fall and winter of 1876.

## NEW ORLEANS, LA.

The coal brought to this market is almost exclusively Pittsburgh coal. The flats and barges are towed by powerful towboats built expressly for that purpose. The towing between Pittsburgh and Louisville depends on the state of the river. When the stage of water is too low for navigation, which it frequently is for weeks, and even months, the supplies at the lower points become deficient and prices naturally advance, often reaching very high prices. The coal flats and barges sent to New Orleans are generally dropped at Willow Grove, near Greenville, just above the city, where they are superintended for the owners or agents. When a boat or barge is wanted, a small city tugboat is sent to tow it to the city, or to its destination on the coast.

The largest amount of coal consumed the past six years, was 301,555 tons in 1869, and the least, 211,727 tons in 1875.

Messrs. C. A. Miltenberger & Co., give the following as the consumption of Pittsburgh coal at this port:—

YEAR.	BBLs.	YEAR.	BBLs.
1869.....	3,317,000	1874.....	2,749,500
1870.....	3,203,500	1875.....	2,448,000
1871.....	3,112,000	1876.....	2,802,700
1872.....	3,991,500	1877.....	3,014,200
1873.....	2,821,500	1878.....	2,999,600

In addition to the figures for 1876, add some 84,000 barrels of St. Bernard coal, from Kentucky; for 1877, 56,000 barrels and for 1878, 90,000 barrels. Boats average 9,000 barrels; barges, 4,500 barrels; French Creeks, 3,400 barrels. It is estimated that eleven barrels make a ton of 2,000 pounds. The distance from Pittsburgh to New Orleans is some 2,000 miles, and the rate of freight is about three and one-half cents per bushel.

The wholesale price of Pittsburgh coal last year ranged from twenty-seven to thirty-five cents per barrel, of two and one-half bushels. A small amount of Anthracite was received here, and sold for \$5.50@6 00 per net ton at wholesale.

The arrivals numbered 392 boats and 86 barges last year, and consumption footed up 292 boats and 86 barges. The low prices recorded is attributed to the heavy receipts; it is stated that sales were made at even less than the quotations named.

**ANTHRACITE.**—Anthracite contains a small portion of volatile matter, its component parts being carbon, oxygen, hydrogen and nitrogen—the hydrogen being either combined with the oxygen to form water, or with a small portion of carbon to form carburetted hydrogen, which exists in a gaseous state in the pores of the coal. In Bituminous coal, the hydrogen is combined with a larger proportion of oxygen and nitrogen, the mechanical difference being that the Bituminous and free-burning coals, in particular, melt by heat when the bitumen reaches the boiling point—whereas Anthracite is not fusible, nor will it change its form until it is exposed to a much higher temperature.



## BUFFALO, N. Y.

The coal received at this city is distributed to the trade for family use; to the local manufacturing and gas works; to the interior trade for gas works, family use and manufacturing purposes; the West is supplied principally with Anthracite from this port, being taken at low rates of freight in return grain vessels to Chicago, Milwaukee, Duluth, etc.,

The receipts for a series of years have been as below :—

	BITUMINOUS.			ANTHRACITE.	
	By Lake.	By Canal.	By Rail.	By Canal.	By Rail.
1863.....	71,323	12,551	.....	123,319	.....
1864.....	65,214	35,237	.....	154,214	.....
1865.....	68,141	42,322	.....	143,998	.....
1866.....	63,142	62,172	.....	248,716	.....
1867.....	101,107	67,124	.....	223,718	.....
1868.....	91,457	73,596	.....	318,353	.....
1869.....	99,460	108,972	.....	112,914	187,000
1870.....	94,796	163,437	.....	177,027	250,000
1871.....	88,511	80,660	76,063	102,185	300,000
1872.....	78,879	95,500	109,397	190,994	330,000
1873.....	87,724	125,000	190,000	255,044	479,885
1874.....	67,467	70,000	140,000	252,262	320,000
1875.....	82,767	45,000	350,000	250,206	500,000
1876.....	21,418	30,000	297,842	151,175	350,000
1877.....	44,247	10,000	214,200	209,609	550,000
1878.....	50,001	13,353	425,973	115,162	660,000

The shipments of Bituminous eastward by canal from Buffalo were as below :—

YEARS.	TONS.	YEARS.	TONS
1863.....	20,125	1871.....	60,522
1864.....	30,043	1872.....	53,198
1865.....	28,283	1873.....	68,210
1866.....	50,202	1874.....	46,995
1867.....	57,495	1875.....	23,100
1868.....	59,766	1876.....	19,153
1869.....	62,690	1877.....	29,250
1870.....	65,900	1878.....	39,820

The Bituminous *by canal*, was Blossburg coal.

In addition to the Bituminous *by rail*, add for Blossburg coal : 35,000 tons in 1878, 50,000 tons in 1877, 25,000 tons in 1876, 75,000 tons in 1875, 50,000 tons in 1874, 80,000 tons in 1873.

Shipments of Anthracite, west via the Lakes :—

1873.....	510,443 tons.	1876.....	321,455 tons.
1874.....	344,500 tons.	1877.....	405,074 tons.
1875.....	339,722 tons.	1878.....	306,172 tons.

The freights to Chicago opened at twenty-five cents per ton; continued at this until June, when they advanced to thirty cents; in August returned to twenty-five cents and continued until November 6th, when they advanced to 45@50 cents, and thus to the end of the season.

## CHICAGO, ILL.

This city is supplied with Anthracite coal at low rates from the fact that the bulk of the supply comes by the Lakes, as return freight to the grain vessels loaded here. As a result it appears that although the railway system connecting this city with many of the Western Bituminous coal fields is so complete, the amount of Anthracite received, is one-sixth of the sum total.

The receipts for the years 1876—1878 are shown below:—

Received by	Tons—1876.	Tons—1877.	Tons—1878.
Lake .....	711,572	804,759	730,000
Illinois and Michigan canal.....	5,292	8,828	9,569
Chicago and Northwestern railroad .....		2,949	96
Illinois Central railroad .....	16,348	28,274	24,953
Chicago, Rock Island and Pacific railroad.....	22,703	85,876	29,595
Chicago, Burlington and Quincy railroad.....	10,986	40,923	22,255
Chicago and Alton railroad .....	293,807	283,213	391,461
Chicago and Eastern Illinois railroad.....	196,865	178,146	206,817
Lake Shore and Michigan Southern .....	55,205	78,978	89,248
Pittsburgh, Ft. Wayne and Chicago railroad .....	142,691	102,241	160,709
Pittsburgh, Cincinnati and St. Louis railroad.....	106,774	105,012	90,335
Baltimore and Ohio railroad .....	17,804	22,236	6,918
Michigan Central railroad.....	38,774	48,574	70,023
Totals .....	1,619,033	1,749,091	1,832,033

## RECEIPTS BY LAKE.

Years.	ANTHRACITE.	Tons.	Years.	BITUMINOUS.	Tons.
1870 .....		340,730	1870 .....		181,850
1872 .....		495,765	1872 .....		90,820
1873 .....		538,837	1873 .....		199,107
1874 .....		895,680	1874 .....		261,790
1875 .....		518,971	1875 .....		272,831
1876 .....		362,373	1876 .....		334,055
1877 .....		442,325	1877 .....		360,158
1878 .....		325,553	1878 .....		494,447

## TOTAL RECEIPTS AT THE CITY OF CHICAGO.

YEARS.	TONS.	YEARS.	TONS.	YEARS.	TONS.
1852 .....	46,233	1861 .....	184,080	1870 .....	887,474
1853 .....	38,548	1862 .....	218,423	1871 .....	1,081,472
1854 .....	56,774	1863 .....	284,196	1872 .....	1,398,024
1855 .....	109,576	1864 .....	323,275	1873 .....	1,668,257
1856 .....	93,020	1865 .....	344,854	1874 .....	1,359,496
1857 .....	171,379	1866 .....	496,193	1875 .....	1,641,488
1858 .....	87,290	1867 .....	546,208	1876 .....	1,619,033
1859 .....	131,204	1868 .....	658,243	1877 .....	1,749,091
1860 .....	131,081	1869 .....	799,000	1878 .....	1,832,033

The ton weight designated in these tables is that of 2,000 pounds.

It is stated that the Anthracite trade shows a falling off, from the fact that shipments are now made direct to many of the interior cities; there is no accounting made of this direct tonnage, in the Chicago report.

## ST. LOUIS, MO.

By far the largest proportion of the Bituminous received at this city is from the Belleville district, in St. Clair county, Illinois. The principal seam worked is five to seven feet in thickness, and is economically mined. Analysis of this coal shows—water, 6; volatile matter, 38.8; fixed carbon, 52.2; ash, 5. The Iron Mountain railroad brings the semi-Anthracite coal, known as the "Spadra," from Arkansas, to this city.

Mr. Geo. H. Morgan sends us the following statement of the receipts of coal at St. Louis, for the year 1878, with a comparison from 1872 :—

By Ohio and Mississippi railroad.....	2,932,025 bushels.
By Indiana and St. Louis railroad.....	98,050 bushels.
By St. Louis, Vandalla and T. H. railroad.....	6,480,925 bushels.
By Belleville and Southern railroad.....	7,827,575 bushels.
By Wabash railroad.....	2,220,300 bushels.
By St. Louis and Southern railroad.....	4,042,875 bushels.
By Illinois and St. Louis railroad.....	5,293,550 bushels.
By Cairo and St. Louis railroad.....	676,875 bushels.
From Ohio river*.....	2,149,625 bushels.
From Grand Tower.....	73,000 bushels.
From St. Louis county—estimated.....	1,000,000 bushels.

Total.....33,087,300 bushels.

Twenty-five bushels of eighty pounds each, to the ton of 2,000 lbs.

Total for the year 1877.....	35,856,850 bushels.
Total for the year 1876.....	32,073,125 bushels.
Total for the year 1875.....	32,466,650 bushels.
Total for the year 1874.....	29,923,050 bushels.
Total for the year 1873.....	32,608,795 bushels.
Total for the year 1872.....	24,557,425 bushels.

\*Includes 1,079,750 bushels of coke.

There was sent out of the city 1,036,125 bushels (or 41,445 tons) during '78, by railroad and river. We have no details of the quantity of Anthracite dealt in at this city, but it is growing in favor, from the low price at which it has been furnished.

## PROVIDENCE, R. I.

Receipts of coal at this point have been, in tons of 2,240 lbs.:

1871.....	Domestic, 504,006	Foreign, 13,900
1872.....	Domestic, 623,842	Foreign, 9,454
1873.....	Domestic, 634,112	Foreign, 3,232
1874.....	Domestic, 532,564	Foreign, 6,604
1875.....	Domestic, 602,847	Foreign, 663
1876.....	Domestic, 610,339	Foreign, .....
1877.....	Domestic, 636,480	Foreign, 8,831

In 1878, 570,242 tons Anthracite, and 5,936 tons Bituminous.

## CLEVELAND, OHIO.

This city receives a fine and varied assortment of Bituminous coal. A great many coal basins—in fact, nearly all the Ohio formation, as well as most of the coals lying west of the Allegheny mountains, in Pennsylvania—here find a market and a distributing point for the West, Northwest, Eastern, and Canada trade. The great number of vessels employed in the iron ore and lumber trade naturally seek coal as a back freight or for ballast, which enables Cleveland to place coal in distant ports, like Chicago, Milwaukee and on Lake Superior, at merely nominal rates. The business has been developed within the last fifteen years, and taking the rapid growth of the manufacturing interest in the West, into consideration, it is safe to presume that the trade has not yet reached its ultimate proportions.

The total receipts of coal at Cleveland, from 1828 to 1852, amounted to 662,862 tons ; having increased from thirty tons in 1828, to 137,926 tons in 1852, we have no details from this date until 1865, but the following will serve to show the growth of the trade :—

YEAR.	TONS.	YEAR.	TONS.
1865.....	465,550	1872.....	1,348,160
1866.....	583,407	1873.....	1,599,212
1867.....	668,026	1874.....	1,215,353
1868.....	759,104	1875.....	1,414,124
1869.....	922,757	1876.....	1,250,531
1870.....	904,600	1877.....	1,363,345
1871.....	1,165,940	1878.....	1,310,838

The ton designated is that of 2,000 lbs. The shipments from this point, by lake, have been :—

	1875.	1876.	1877.	1878.
To ports in British Provinces.....	140,637	156,857	80,243	61,869
To domestic ports.....	531,177	372,834	549,920	597,412

Until 1845 the entire trade of the lakes in Bituminous coal, was in the hands of Cleveland dealers. About this time, possibly a year or two earlier, Erie began to ship coal, the joint receipts from the interior, at the two places, being only 45,136 tons.

It appears that Cleveland is losing ground in the coal trade. The following figures give the number of tons of coal shipped from three points during five years.

Years.	Cleveland.	Black River.	Ashtabula.
1873.....	914,562	411	2,046
1874.....	580,672	6,158	42,676
1875.....	671,814	15,806	74,611
1876.....	529,691	49,627	49,953
1877.....	629,163	115,602	53,585

These figures show that Black River and Ashtabula shipped twenty-seven per cent. as much coal as Cleveland. The quantity of coal shipped from this marine district in 1877 was only 188,000 tons less than in 1873. This is comparatively a small decrease. But the falling off in Cleveland has been enormous. The amount of coal shipped from this city was 286,488 tons less than in 1873. Of this decrease 161,187 tons may be accounted for only by the increase at the enterprising harbors of Ashtabula and Black River.



## MOBILE, ALA.

Total receipts for year 1872.....	9,920 tons of 2,240 lbs.
Total receipts for year 1873.....	9,325 tons of 2,240 lbs.
Total receipts for year 1874.....	6,984 tons of 2,240 lbs.
Total receipts for year 1875.....	5,977 tons of 2,240 lbs.
Total receipts for year 1876.....	4,999 tons of 2,240 lbs.
Total receipts for year 1877.....	9,535 tons of 2,240 lbs.
Total receipts for year 1878.....	4,038 tons of 2,240 lbs.

The above are for years ending with September 30. We are informed that for the calendar year 1878 some 2,144 tons Alabama coal was received, and 2,132 tons Pennsylvania and English. The principal use of the Pennsylvania coal is for gas. The improvement of the navigable streams that flow through the coal fields, to the Gulf of Mexico, would allow a large business to be done from this port, in the coals that are so abundant in the State of Alabama. During the past season two boat loads of coal from Tuscaloosa were sold at the wharf at \$4.50 per ton, showing at what low prices Steam Coal can be had; but we understand that there is an enterprise now under headway, which, if successful, will make this, in the next few months, a very cheap coal market. At the present time there is only a home market, and that only for household purposes. Mr. W. H. Leslie, furnishes the details of this market.

## PITTSBURGH, PA.

Situated as it is, in the midst of a coal-producing country, and having so many connections by rail and water, with coal and iron deposits, this city has taken a high position among the industrial centres of the United States.

The business that is done here in the course of the year, is most difficult to ascertain, as the railway companies do not separate their tonnage into that carried *through*, and that for local use. It is safe to estimate the sum total from the immediate vicinity, at 4,500,000 tons. This is mainly forwarded to points, North, South, East and West, by rail and water. The shipments of coal and coke by the river to points below the city last year amounted to 2,627,750 tons.

The coal shipped down the Ohio river from the neighborhood of Pittsburgh is obtained from receipts through the medium of the Monongahela slack-water navigation system, and the coal carried by the Saw-mill Run railway. The totals are as below:—

Coal and Slack from Pool No. 1.....	12,237,465 bushels.
Coal and Slack from Pool No. 2.....	34,263,450 bushels.
Coal and Slack from Pool No. 3.....	11,336,100 bushels.
Coal and Slack from Pool No. 4.....	12,101,240 bushels.
Total Coke.....	6,887,000 bushels.
Grand totals, Coal, Coke and Slack.....	76,825,255 bushels.
Saw-mill Run Railroad Coal Tonnage total in 1878.....	2,321,991 bushels, or 88,235 net tons.

The above gives the tonnage that starts out from the several mines along the routes named and is what is known as 'River' coal. A portion is left for local consumption in Pittsburgh, Allegheny, etc., and the following is a summary of the entire movement of coal and coke.

Coal by slack-water.....	69,933,255 bushels.
Coke by slack-water.....	6,887,000 bushels.
Coal by Saw-mill Run Railroad.....	2,321,991 bushels.
Total movement.....	79,147,246 bushels.
Shipments down the Ohio.....	65,697,000 bushels.
Leaving for local consumption.....	13,450,246 bushels.

There is a large amount of coal for local use received by rail and it may be estimated at twice as much as the above quantity. Estimate 25 bushels to the net ton.

Reference is invited to the article on Connellsville Coke, also to the tonnage of railroads tributary to the coal fields in the vicinity of this city, to be found on other pages.

## RICHMOND, VA.

This city is assuming considerable importance in the coal trade, through the efforts of the Chesapeake and Ohio railroad, to build up a trade for the shippers. We append statistics of the total coal business of the Chesapeake and Ohio railroad:—

Quality.	Tons—1875.	Tons—1876.	Tons—1877.	Tons—1878.
Cannel.....	39,795	52,980	42,000	53,400
Splint and Bituminous.....	176,650	194,660	245,995	310,286
Coke.....	25,580	28,535	36,070	31,953
Totals.....	242,025	276,175	324,065	595,639
Shipments of coal to Eastern cities were..	90,715	112,690	124,980	140,921

The following statement of coal receipts at the Richmond market, for the city consumption, taken from official returns, will not be without interest:—

Character of coal.	1873.	1874.	1875.	1876.	1877.	1878.
Chesapeake and Ohio.....	4,460	8,524	21,556	29,235	50,656	54,552
Anthracite and Cumberland.....	64,916	58,545	46,193	40,983	46,875	39,709
Chesterfield, etc., etc.....	68,319	57,869	55,844	39,863	36,010	34,621
Totals.....	137,695	124,938	123,593	110,136	133,541	128,882

## ASHTABULA, OHIO.

The coal business of this port is assuming considerable proportions ; it is taking some of the trade from Cleveland. The total coal shipments in 1877, was 81,027 tons. In 1878, Messrs. Rhodes & Co, shipped 58,304 tons ; Messrs. Strong & Manning shipped 15,000 tons, and Messrs. Andrews, Hitchcock & Co, 55,444 tons. The last named being all Brier Hill coal.

## MONTREAL, P. Q.

The quantity of Anthracite received in 1878, is stated to have been 88,000 tons as against 105,000 tons in 1877. The Bituminous Coal by vessel aggregated 138,080 tons, as against 150,839 tons.

## HAVANA, CUBA.

The receipts of coal at this port, have been as below:—

YEAR.	TONS.	YEAR.	TONS.
1868.....	119,087	1874.....	176,587
1869.....	161,470	1875.....	115,092
1870.....	145,366	1876.....	99,971
1871.....	89,340	1877.....	155,125
1872.....	128,187	1878.....	252,055
1873.....	265,163		

American ( Nova Scotia and U. S. ), in 1878, 119,874 tons ; English, 132,181.

## IMPORTS AND EXPORTS.

The tariff from 1824 to 1843, was six cents per bushel, or \$1.68 per ton; from 1843 to 1846, \$1.75 per ton; 1846, 30 per cent. ad valorem: 1847 to 1861, 24 per cent. ad valorem; 1862-3-4, \$1.00 per ton; 1865, \$1.10; 1866 to 1872, \$1.25 per ton; since August, 1872, 75 cents per ton. During the period from June, 1854, to March, 1866, the Reciprocity treaty was in force, and coal from the British possessions in North America, was admitted into the United States, duty free

The imports of coal into the United States, since 1821, have been :

YEARS.	TONS.	YEARS.	TONS.
1821.....	22,419	1850.....	180,439
1822.....	34,672	1851.....	214,774
1823.....	30,535	1852.....	183,015
1824.....	20,440	1853.....	231,508
1825.....	25,795	1854.....	252,865
1826.....	34,643	1855.....	237,408
1827.....	40,264	1856.....	293,507
1828.....	32,364	1857.....	360,712
1829.....	45,463	1858.....	396,628
1830.....	53,582	1859.....	403,928
1831.....	36,503	1860.....	398,986
1832.....	72,973	1861.....	465,434
1833.....	92,432	1862.....	541,099
1834.....	71,626	1863.....	624,378
1835.....	59,963	1864.....	567,738
1836.....	103,432	1865.....	684,180
1837.....	153,450	1866.....	696,093
1838.....	129,082	1867.....	521,305
1839.....	181,555	1868.....	396,123
1840.....	162,867	1869.....	423,566
1841.....	155,394	1870.....	420,683
1842.....	141,521	1871.....	443,955
1843.....	41,163	1872.....	490,631
1844.....	87,073	1873.....	456,015
1845.....	85,766	1874.....	493,023
1846.....	156,853	1875.....	441,600
1847.....	148,021	1876.....	407,853
1848.....	196,163	1877.....	497,260
1849.....	198,213	1878.....	578,457

The exports of coal have been as below :—

YEAR.	TONS.	YEAR.	TONS.
1870.....	227,918	1875.....	519,345
1871.....	277,951	1876.....	568,076
1872.....	401,078	1877.....	740,456
1873.....	584,633	1878.....	660,139
1874.....	763,402		

Years are to June 30.—U. S. Gov't. fiscal year.

Details of the exports for the fiscal year ending June 30, 1878, are given below :—

COUNTRIES.	Anthracite.	Bituminous.
	Tons.	Tons.
Austria .....	202	.....
Brazil .....	1,852	533
Central American States .....	11	94
Chili .....	1,093	510
China .....	3,659	.....
Danish West Indies .....	1,497	11,360
France .....	764	.....
French West Indies and French Guiana .....	240	615
Miquelan, Langley and St. Pierre Islands .....	30	.....
French Possessions, all other .....	.....	1
Nova Scotia, New Brunswick and Pr. E. Island .....	30,377	5,054
Quebec, Ontario, Manitoba and Northwest Territory .....	268,378	214,982
British Columbia .....	17	22
New Foundland and Labrador .....	98	.....
British West Indies and British Honduras .....	1,471	1,222
British East Indies .....	454	.....
Hong-Kong .....	1,359	.....
British Possessions in Australasia .....	10	.....
Hawaiian Islands .....	842	257
Hayti .....	.....	713
Italy .....	2,060	16
Japan .....	706	.....
Mexico .....	756	3,144
Dutch East Indies .....	101	.....
Peru .....	1,878	.....
Azore, Madeira and Cape Verde Islands .....	325	.....
San Domingo .....	434	297
Cuba .....	17,983	62,613
Porto Rico .....	43	32
United States of Columbia .....	3,373	17,431
Venezuela .....	650	581
<b>Total .....</b>	<b>340,661</b>	<b>319,477</b>

The imports are from Australia, to San Francisco ; from British Columbia, to the same ; from Great Britain, to Atlantic and Pacific coasts ; and from Nova Scotia to Atlantic coast ports.

Imports and Exports for the calendar years named have been :—

	1878.	1877.	1876.	1875.
Imports Bituminous coal .....	556,938	493,275	488,132	411,723
Exports Bituminous coal .....	312,273	324,839	253,387	234,997
Exports Anthracite coal .....	345,347	377,979	362,044	361,669

All tons, 2240 lbs.

## ANTHRACITE ON THE PACIFIC.

Anthracite coal has been found at Queen Charlotte Islands, in British Columbia, on the Pacific coast of North America. We give analyses—No. 1 being from a six-foot seam, and No. 2 being from the three-foot seam.

	No. 1.	No. 2.
Water .....	1.60	1.89
Volatile matter .....	5.02	4.77
Fixed carbon .....	83.09	85.76
Sulphur .....	1.53	0.89
Ash .....	8.76	6.69

The mines have been abandoned on account of crushes and faults.



## GREAT BRITAIN.

## MINERALS PRODUCED IN GREAT BRITAIN.

MINERALS.	Tons raised in 1874.	Tons raised in 1875.	Tons raised in 1876.	Tons raised in 1877.
Coal.....	125,043,257	131,867,105	133,344,766	134,610,763
Iron ore.....	14,844,936	15,821,060	16,841,583	16,692,802
Copper ore.....	78,521	71,528	79,252	73,141
Tin ore.....	14,039	13,995	13,688	14,142
Lead ore.....	76,201	77,746	79,096	80,850
Zinc ore.....	16,830	23,973	23,613	24,405
Iron pyrites.....	56,208	48,035	48,809	43,943
Arsenic.....	6,268	5,061	4,228	4,809
Manganese.....	5,778	3,205	2,796	3,038

## METALS OBTAINED FROM THE ORES ENUMERATED.

	1874—Tons.	1875—Tons.	1876—Tons.	1877—Tons.
Iron, pig.....	6,991,408	6,365,462	6,555,997	6,608,664
Tin.....	9,942	9,614	8,500	9,500
Copper.....	4,931	4,322	4,694	4,486
Lead.....	58,777	57,435	58,667	61,403
Zinc.....	4,470	5,715	6,641	6,281
Silver (ounces).....	509,277	487,368	493,422	501,435

Absolute total value of the metals and coal, with other minerals which are not smelted, (except building stone, lime, slate, and common clay), produced in the United Kingdom :—

	1874.	1875.	1876.	1877.
Value of the metals produced .....	£19,539,070	£13,476,746	£18,668,818	£18,742,960
Value of the coal.....	45,849,194	46,163,486	46,670,663	47,113,767
Value of other minerals.....	2,446,049	2,847,456	2,887,367	2,424,679
Total.....	£67,834,313	£67,487,688	£68,226,853	£68,281,406

The ton weight in all cases is 2,240 lbs.

The report, by ROBERT HUNT, Keeper of the Mineral Statistics of Great Britain, gives the output of the 3,738 collieries in operation, as below :—

District.	Tons	District.	Tons.
North Durham and Northumberland.....	11,975,250	Shropshire.....	927,550
Cumberland.....	1,515,733	Gloucestershire.....	1,194,726
South Durham.....	19,235,150	Somersetshire.....	{ 666,500
Westmoreland.....	1,791	Devonshire.....	
Cheshire.....	645,500	Monmouthshire.....	4,350,735
Lancashire, North and East.....	8,735,055	NORTH WALES.—Flintshire.....	855,750
Lancashire West.....	8,886,476	Denbighshire.....	1,622,530
Yorkshire, West Riding.....	15,952,500	Anglesea.....	1,330
Yorkshire, North Riding.....	8,150	SOUTH WALES.—Glamorganshire.....	11,889,600
Derbyshire.....	6,975,550	Carmarthenshire....	526,450
Nottinghamshire.....	3,895,750	Pembrokeshire.....	76,400
Warwickshire.....	930,850	Brecknockshire....	141,885
Leicestershire.....	1,149,590	SCOTLAND, East.....	11,452,373
Staffordshire, South, & Worcestershire..	9,841,191	SCOTLAND, West.....	6,867,701
Staffordshire, North.....	4,149,975	IRELAND.....	138,722

The receipts of coal at London, for a series of years, have been as below :—

YEAR.	By Sea.	By Canal,	By Rail.	Total.
1865.....	3,161,683	8,532	2,733,056	5,903,271
1866.....	3,033,193	10,176	2,969,896	6,013,215
1867.....	3,016,416	9,965	3,295,652	6,322,033
1868.....	2,918,230	9,527	2,979,333	5,907,090
1869.....	2,873,688	6,941	3,341,585	6,212,214
1870.....	2,993,710	7,301	3,758,089	6,759,100
1871.....	2,762,712	6,615	4,449,141	7,218,468
1872.....	3,548,918	8,236	4,999,268	7,556,422
1873.....	2,665,630	11,195	5,147,413	7,824,238
1874.....	2,727,719	5,982	4,689,785	7,423,486
1875.....	3,134,846	4,594	5,065,452	8,204,892
1876.....	3,273,443	4,696	5,173,237	8,451,375
1877.....	3,170,601	4,608	5,426,204	8,501,413
1878.....	3,198,309	2,977	5,593,290	8,794,576

Of the receipts in 1878, some 2,115,446 tons were afterward conveyed beyond the limits, leaving 6,679,130 tons as consumed in the city.

The following will show the exportation of coal since 1854:—

YEARS.	TONS.	YEARS.	TONS.
1854.....	4,300,000	1867.....	10,415,787
1855.....	4,900,000	1868.....	10,837,804
1856.....	5,800,000	1869.....	10,588,425
1857.....	6,600,000	1870.....	11,495,002
1858.....	6,500,000	1871.....	12,851,957
1859.....	7,000,000	1872.....	13,211,961
1860.....	7,400,000	1873.....	12,712,222
1861.....	7,200,000	1874.....	13,927,205
1862.....	7,600,000	1875.....	14,475,036
1863.....	7,500,000	1876.....	16,299,077
1864.....	8,809,903	1877.....	15,420,050
1865.....	9,170,477	1878.....	19,501,826
1866.....	9,053,721		

In the exports for 1878, we have included 4,018,010 tons of coal for steamers engaged in foreign trade. This item is often excluded from the calculations

The coal raised in 1876 was used by the several industries named, in the proportions stated below :—

Used for steam-power.....	23.52 per cent.
Domestic consumption.....	17.20 per cent.
In the manufacture of pig iron.....	15.21 per cent.
In the manufacture of merchant iron and steel.....	15.00 per cent.
Exported.....	9.27 per cent.
Consumed in and about coal mines.....	6.25 per cent.
For the manufacture of gas.....	5.87 per cent.
For steam navigation.....	3.00 per cent.
Locomotives and engines on railways.....	1.88 per cent.
Waterworks, breweries, etc.....	1.35 per cent.
Smelting tin, copper, lead, etc.....	0.80 per cent.
Consumed in and about metal mines.....	0.47 per cent.
For use in army department.....	0.18 per cent.

## COAL IN AUSTRIA.

In this country coal mining dates back to the year 1550. In 1819, it had amounted to 94,607 tons ; in 1825, to 154,944 tons ; in 1830, to 211,298 tons ; in 1835, to 250,782 tons ; in 1840, to 469,212 tons ; in 1845, to 721,707 tons ; after this date the Lignite and Coal is separated and the following table shows the progress of the industry.

YEAR.	Coal.	Lignite.	Total.
1850.....	584,068	360,255	944,323
1855.....	1,180,449	920,601	2,101,050
1860.....	1,948,189	1,548,306	3,496,495
1865.....	2,836,884	2,232,419	5,069,303
1870.....	4,295,775	4,060,169	8,355,944
1871.....	4,969,980	5,078,058	10,048,038
1872.....	4,788,455	5,767,612	10,556,067
1873.....	5,171,189	6,732,884	11,904,073
1874.....	5 096,659	7,183,098	12,279,757
1875.....	5,185,234	7,666,812	12,852,046
1876.....	5,564,331	7,798,255	13,362,58
1877.....	5,480,311	8,771,727	14,252,038

Upwards of 1,500,000 tons of Prussian coal is received, and 2,750,000 tons of coal is exported, mainly to Germany. Thus, the consumption within the State is 12,000,000 tons.

The above includes Hungary. Tons are 2,204 lbs.

## COAL IN RUSSIA.

Coal mining in Russia has not met with any great attention, from the amount of wood yet available. The supply of mineral however, is something enormous, and calculations have been made showing a supply equal to possible demands, for thousands of years.

We are enabled to give the following statistics of the production. It will be noticed that the coal industry is rapidly developing in this country :—

YEARS.	TONS.	YEARS	TONS.
1867.....	437,625	1874.....	1,369,025
1871.....	829,745	1875.....	1,709,269
1872.....	1,097,864	1876.....	1,823,128
1873.....	1,170,979	1877.....	1,900,000

Metric tons, of 2,204 lbs.

Of the product in 1876, 1,248,816 tons is classed as coal, 545,037 tons Anthracite ( $84\frac{1}{4}$  to  $95\frac{1}{2}$  p. c. of carbon) and 29,275 tons Lignite. The Anthracite is from the Donetz district, in the Department of the Don-Cossacks.

No coal is exported but the imports reach up to 1,500,000 tons ; the English furnishing three-fifths of this quantity, the remainder being from Germany.

## COAL IN SWEDEN.

The quantity mined amounts to 75,000 tons, and importations of British coal rise to 900,000 tons annually.

## COAL IN ITALY.

But little true coal is mined in this country, although there is said to be good coal and Anthracite in the Province of Udine. Of the Lignite there is 125,000 tons raised annually, and 95,000 tons of Peat. Great Britain sends 1,500,000 tons of coal to this State annually.

## COAL IN INDIA.

The coal area of the Indian Empire, is stated at 2,004 square miles; the production is rapidly increasing, until now an annual output of one million tons is recorded. We have the statement that the entire output of native coal may at present be equal to four or five million tons. One company alone, (two years ago) was raising 800 tons per diem. The coal has but one-third the strength of English. The quantity of British coal received is now something like one million tons annually.

## COAL IN THE GERMAN EMPIRE.

This country, as now consolidated, ranks as the largest producer of coal in Europe. Since 1870, the Empire includes old Prussia, Saxony, Bavaria, and the States of the Zollverien. The product of coal of all kinds in the whole of the German States, amounts to something like fifty million tons annually. The grand total of the output in 1871, when the consolidation of the Empire was completed, was 37,852,464 tons of 2240 lbs. Of the quantity now sent out of the pits, Prussia is to be credited with 89 per cent.

### *Output of COAL in the Empire, as now constituted*

1843.....	4,333,585 tons.	1872.....	33,806,418 tons.
1857.....	11,279,266 tons.	1873.....	36,392,280 tons.
1867.....	23,808,071 tons.	1874.....	35,918,614 tons.
1868.....	25,704,758 tons.	1875.....	37,436,368 tons.
1869.....	26,774,368 tons.	1876.....	38,454,428 tons.
1870.....	26,397,770 tons.	1877.....	37,576,071 tons.
1871.....	29,373,272 tons.		

### *Output of LIGNITE in the Empire, as now const tuted.*

1848.....	1,417,420 tons.	1872.....	9,018,048 tons.
1857.....	3,587,855 tons.	1873.....	9,752,914 tons.
1867.....	6,994,818 tons.	1874.....	10,739,532 tons.
1868.....	7,174,365 tons.	1875.....	10,367,686 tons.
1869.....	7,569,545 tons.	1876.....	11,096,034 tons.
1870.....	7,605,234 tons.	1877.....	10,720,296 tons.
1871.....	8,482,838 tons.		

There is imported 2,000,000 tons coal, 260,000 tons coke and 2,500,000 tons lignite: and the exports amount to 5,000,000 tons coal, 350,000 tons coke and 10,000 tons of lignite. The city of Berlin used something like 1,110,216 tons of coal of all kinds in 1877. All tons used are of 2204 lbs.

## COAL IN CHILE.

The coal is of a lignitic character, and amounts to a yearly business of 400,000 tons, of which 50,000 tons is exported. On the contrary, 125,000 tons is imported from Great Britain.

## COAL IN CHINA.

China is in possession of coal deposits which are a surprise to the Europeans. Coal was worked 2,200 years ago, at least. The Anthracite basin of Southern Shan-se is so rich than an output of three hundred millions per annum, would be available for 2,400 years. The annual product now is set down at three million metric tons, of which one million is Anthracite.



## COAL IN BELGIUM.

The coal area of the Kingdom is stated at 510 square miles ; as will be seen from the figures given below, the production is quite large, having averaged something like fifteen million tons annually, for some years past. The province of Hainault furnishes the largest proportion, 10,259,374 tons having been mined there during the year 1877 ; there is an export trade of about 3,600,000 tons to France and Germany, and an import of 800,000 tons from Great Britain.

The progress of the extraction of coal has been as below, in metric tons of 2,204 lbs.

YEAR.	TONS.	YEAR.	TONS.
1830.....	2,345,797	1853.....	12,298,539
1835.....	2,557,097	1869.....	12,943,994
1840.....	3,929,962	1870.....	13,697,118
1845.....	4,919,156	1871.....	13,733,176
1850.....	5,320,884	1872.....	15,658,948
1855.....	8,409,330	1873.....	15,778,401
1860.....	9,609,895	1874.....	14,669,029
1865.....	11,540,703	1875.....	15,011,331
1866.....	12,774,662	1876.....	14,329,578
1867.....	12,755,822	1877.....	13,938,523

Artificial Fuel is made to the extent of perhaps half a million tons annually. The consumption of coal within the State is something like ten and a half million tons.

## VANCOUVER'S ISLAND.

This island is located on the western coast of North America, within the limits of the Dominion of Canada. The coal area is estimated at 390 square miles. San Francisco, (Cal.) receives a large percentage of the output. The tonnage produced is stated as below :—

YEAR.	TONS.	YEAR.	TONS.
1870.....	29,863	1875.....	110,145
1871.....	45,000	1876.....	140,087
1872.....	46,148	1877.....	154,052
1873.....	45,723	1878.....	190,640
1874.....	81,397		

Tons are stated at 2,240 lbs.

## COAL IN NEW SOUTH WALES.

One of the most important coal-producing countries of the globe is that portion of Australia, known as New South Wales ; the trade has sprung up within a very few years, and the outlook for the trade is most encouraging, as the coal has been found equal to the English steam coal, and adopted by the Home government ; the approximate area of the coal fields is 24,840 square miles ; the production from the opening of the mines up to the year 1874, amounted to 12,387,279 tons. Production has been as below :—

YEAR.	TONS.	YEAR.	TONS.
1829.....	780	1872.....	1,012,426
1839.....	21,283	1873.....	1,002,862
1849.....	48,516	1874.....	1,261,351
1859.....	303,213	1875.....	1,253,475
1869.....	919,774	1876.....	1,319,918
1870.....	868,564	1877.....	1,444,171
1871.....	898,784		

All quantities figured at 2,240 lbs. per ton.

Of the product of 1877, 563,757 tons went to neighboring colonies, 528,444 tons were consumed at home, and 351,970 tons were sent to foreign ports.

## NOVA SCOTIA.

The Inspector of Mines, H. S. POOLE, furnishes the following summary of the *coal sales* of Nova Scotia, since the beginning of the industry in that province.

YEAR.	TONS.	YEAR.	TONS.
1785—1790.....	14,349	Total to 1871.....	10,069,143
1791—1800.....	51,043	For 1871 .....	596,418
1801—1810.....	70,452	For 1872.....	785,914
1811—1820.....	91,527	For 1873 .....	881,106
1821—1830.....	140,820	For 1874.....	749,127
1831—1840 .....	839,981	For 1875.....	706,795
1841—1850.....	1,533,793	For 1876.....	634,207
1851—1860.....	2,938,829	For 1877.....	687,065
1861—1870 .....	4,927,339	For 1878.....	693,511

The duty on the coal imported into the United States is seventy-five cents per ton, gold, on the round or coarse coal, and forty cents per ton, on the culm or slack; that is the coal which passes through bars not wider than three-quarters of an inch. About eight per cent. of the coal sold is culm. We give below the duty at various dates:—

1846 to 1862.....	24 per cent. advalorem
1862—3-4.....	\$1.00 per ton.
1865.....	1.10 per ton.
1866—1872.....	1.25 per ton.
1872 to date.....	.75 per ton.

Reciprocity Treaty in force from June, 1854, to March, 1866.

Number of tons actually raised during a term of years:—

YEAR.	TONS.	YEAR.	TONS.
1864.....	562,102	1872.....	880,950
1865.....	715,786	1873.....	1,051,467
1866.....	664,993	1874.....	872,720
1867.....	517,525	1875.....	781,165
1868.....	462,188	1876.....	709,646
1869.....	578,062	1877.....	757,496
1870.....	625,769	1878.....	770,603
1871.....	673,242		

The colliery consumption last year, was 88,627 tons, and the stock on hand at the end of the year, 20,307 tons.

The destination of the coal sold during the year 1878, together with a comparison of the "markets" is shown below.

MARKETS.	1878—Tons.	1877—Tons.	1876—Tons.	1875—Tons.
Nova Scotia.....	279,172	255,790	225,658	212,630
Quebec.....	83,710	95,118	117,303	189,754
New Brunswick.....	115,245	104,818	101,890	85,963
Newfoundland.....	61,361	49,342	51,742	62,348
P. E. Island.....	43,412	45,169	46,908	43,641
United States.....	88,495	118,216	71,634	88,746
West Indies.....	16,999	13,660	17,971	16,429
South America.....	523	573	—	4,779
East Indies.....	—	—	—	1,003
Great Britain.....	3,594	4,379	1,101	497
Total.....	693,511	687,065	634,207	706,795

Production of each colliery for the years 1875, 1876, 1877 and 1878.

DISTRICT.	1878.	1877.	1876.	1875.
Product.	Product.	Product.	Product.	Product.
<b>CUMBERLAND COUNTY.</b>				
Cumberland .....	—	1,432	5,055	336
Lawrence .....	—	—	—	60
Seaman .....	100	530	—	528
Scotia .....	1,256	1,213	1,286	1,460
Joggins .....	11,896	10,223	14,296	11,908
Spring Hill .....	100,621	93,606	72,595	50,505
<b>PICTOU COUNTY.</b>				
Acadia ..	57,105	63,101	60,280	65,992
Albion Deep .....	—	20,792	136,273	46,948
Albion Main .....	139,424	95,243	—	90,121
Intercolonial .....	59,211	57,827	53,872	72,016
Whitehall .....	—	—	—	214
Nova Scotia .....	5,160	27,001	21,375	60,824
Vale .....	54,495	42,513	34,590	46,547
<b>CAPE BRETON COUNTY.</b>				
Block-house .....	60,770	61,938	34,819	23,064
Caledonia .....	17,843	26,197	30,789	16,566
Collins .....	4,408	7,768	7,693	662
Emery .....	222	—	—	8,356
Gardiner .....	—	3,540	—	10,400
Glace Bay .....	18,806	36,295	30,022	22,734
Gowrie .....	33,093	23,154	20,275	23,924
Ingraham .....	—	10	40	150
International .....	13,723	18,346	24,111	40,489
Lingan .....	15,210	21,054	15,289	22,805
Ontario .....	19,815	13,391	11,095	5,653
Reserve .....	9,282	—	—	9,403
South Head .....	—	363	653	1,116
Sydney .....	135,188	109,098	102,644	124,199
Victoria .....	12,191	14,262	17,072	18,814
<b>INVERNESS COUNTY.</b>				
Port Hood, etc. ....	741	1,072	2,548	720
<b>VICTORIA COUNTY.</b>				
New Campbellton .....	538	2,527	3,362	4,561
Total coal raised .....	770,603	757,496	709,646	781,165

The ton weight designated is that of 2,240 pounds, in all cases. The coals raised are used for gas, steam and domestic purposes generally, and find favor where they have been used. The coal trade in the Provinces is expected to increase this year, inasmuch as the government will foster the local industries. The receipts at the United States last year do not compare favorably with '77, but it is expected that it will not decrease this year. Prices are and have been low; they do not show anything like the profit that coal mines should be credited with.

## COAL IN JAPAN.

From its location, this country may play an important part in the coal trade of the world. There are some seventy-nine seams, but only ten are more than three feet thick, and at the same time of good quality; nine others of more than three feet in thickness, of poorer quality, may prove workable if it should only require care in mining to separate much of their slaty matter. Besides these, there are ten beds of coal between two and three feet thick, which may be considered of workable character within the long period of time it will take to exhaust even the better beds. The production in 1874, was stated at 396,240 metric tons; and for 1875, 436,826 tons.

## COAL IN SPAIN.

The consumption of coal in Spain is equal to one and a half million tons per annum, and it is estimated that there is sufficient coal within the State to furnish this supply at least 1250 to 1500 years. Mining for coal dates from 1742, but the output until 1825, was of trifling amount. There is a true Bituminous coal and a Lignite. The Provinces from which the supply is extracted are, Leon, Castile and the Asturias. The extent of coal producing area has been set down, as something like 3501 square miles. The following tabular statement is of interest. The quantities expressed are metric tons of 2204 lbs.

YEAR.	COAL.	LIGNITE.	IMPORTATIONS.
1830.....	10,524	—	—
1840.....	19,248	—	—
1850.....	62,923	10,000	185,491
1860.....	320,899	18,952	452,479
1865.....	461,396	34,359	394,806
1870.....	621,832	40,095	566,911
1871.....	589,707	43,824	534,897
1872.....	637,791	33,460	592,567
1873.....	658,744	20,938	619,243
1874.....	695,340	13,346	580,708
1875.....	628,810	25,639	704,287
1876.....	675,926	30,888	774,770
1877.....	699,500	—	837,053

The coal imported, is from Great Britain, and it will be noticed, more than equals the extraction of native coal. The chief manufacturing districts are Catalonia and Austuria; of the towns, Barcelona and Madrid. There should be an export trade, but the lack of capital and enterprise have retarded any native efforts, but the outlook is now for the better. Of the consumption  $37\frac{1}{2}$  p. c. was used in iron and steel industries; 15 p. c. on railways;  $8\frac{1}{2}$  p. c. in gas works;  $12\frac{1}{2}$  p. c. in the navy and merchant fleets: and  $26\frac{1}{2}$  p. c. in divers manufacturing industries. Barcelona received 253,174 tons of English coal in 1877. The duty is 50 cents per ton, and the port charges 65 cents per ton.



## COAL IN FRANCE.

The coal of France is divided into the following varieties ; the tonnage is the output of 1876 :

Anthracite.....	1,123,161 metric tons.
Open-burning hard coal.....	3,183,144 metric tons.
Caking and Smiths' coal.....	408,544 metric tons.
Close-burning coal.....	8,574,216 metric tons.
Flaming coal, open-burning.....	3,350,134 metric tons.
Lignite, etc.....	465 595 metric tons.

Anthracite is found in the departments of the Nord, Sarthe, Mayenne, Isere, and Calvados.

Lignite is found in Isere, Haute-Saone, Vaucluse and Bouches-du-Rhone. In the other basins Coal only is mined.

Something like two million tons is made into coke annually. Large amounts of artificial fuel is made annually from the slack or debris.

Statistics of the output are given below in metric tons of 2204 lbs.

YEAR.	Tons.	YEAR.	Tons.
1787.....	215,000	1870.....	13 179,708
1802.....	844,180	1871.....	13,240,135
1811.....	773,694	1872.....	16 100,773
1820.....	1,093,658	1873.....	17,485,786
1830.....	1,862,665	1874.....	17,059 547
1840.....	3,003 382	1875.....	16,949 032
1850.....	4,433,567	1876.....	17,104,794
1860.....	8,309,622	1877.....	16,889,2 1
1865.....	11,652,755		

But very little coal is exported, say 810,959 tons in 1877, while there is imported something like eight million tons. The consumption of coal is stated to have been 23,849,605 tons in 1877.

Of the exports Belgium takes 10 per cent.; Switzerland takes 14 per cent.; Italy 36 per cent.; and there is sent coastwise and foreign, the remaining 40 per cent. Of the imports Belgium furnishes 50 per cent.; England 36 per cent.; and Germany 14 per cent.

Of the uses to which the consumption is put, we find the following statistics for the year 1872.

In iron-works gas-works, mills and manufacturing.....	16 884,280 tons.
For domestic purposes .....	3 096,040 tons.
Railways and steam navigation.....	2,335 000 tons.
In and about mines and quarries.....	927,110 tons.

## THE COAL OUTPUT OF THE GLOBE.

We have tabulated the following schedule, from the best sources, and the figures may be taken as essentially correct :—

Countries.	Square miles of Coal Area.	Tons—1870.	Tons—1877.
Great Britain.....	11,900	110 431,192	134,610,763
United States .....	192 000	32,863 690	49,130,584
Germany .....	1,770	34,003,004	43,296,367
France.....	2,036	13,179,703	16,889,201
Belgium.....	510	13,697,118	13,993,523
Austria .....	1,800	8,355,944	14,252,039
Russia.....	30,000	829,745	1,900,000
Spain.....	3,501	631,927	699,500
Portugal .....	—	—	20,000
Nova Scotia .....	13,000	625,769	757,496
Australia .....	24 840	868,564	1,444,171
India .....	2,004	500,000	4,000,000
Japan.....	5,000	—	500,000
Vancouver's Island.....	390	29,863	190,640
China, Chile, New Zealand, etc.....	—	3,000,000	4,000,000

The Anglo-Saxon race appears to be emphatically the coal race. The Germans and the English come from the same stock, and both of them have helped very materially to people the United States. Taking the coal production of Great Britain at 135,000,000 tons per annum, while Germany and the United States raise about 100,000,000 tons of coal annually between them, we arrive at the remarkable fact that three countries which may be said to have sprung from the Anglo-Saxon stock produce annually at least 235,000,000 tons of coal. In British dependencies, such as British India, Nova Scotia, and New South Wales, a small further contingent of coal is also made available for combustion. Belgium and France raise between them 30,000,000 tons of coal annually. Austria, Russia, Spain, and a few other countries also produce small further quantities of coal ; but while Great Britain, Germany and the United States raise annually 235,000,000 tons between them, we should not imagine that the corresponding production effected by all other nations attains a collective aggregate of 75,000,000 tons annually. Are we not, then, fully justified in asserting that the Anglo-Saxon race is emphatically the coal race ?

We will go a step further, and will venture to affirm that it is just because it is the coal race, that the Anglo-Saxon race, has achieved the greatest advance in material civilisation. We are not quite sure that this material civilisation is an unmixed boon ; unless it is softened by such influences as religion art, and education, material civilisation degenerates into materialism, and nothing more ; and materialism is the parent of selfishness, which brings enormous evils in its train. Again, it must in fairness be admitted that even material civilisation is many sided, and does not present only one aspect to the impartial observer. Although France may not produce so much coal as Great Britain or Germany, she is none the less a great, a powerful, and a rich nation. If she has less machinery and less steam-power she has a prosperous and varied agriculture ; and the ease with which she raised and paid a huge war indemnity in 1872 and 1873 proved that her people have contrived to amass a great amount of wealth.

## STATISTICS OF ALBERTITE.

New Brunswick, Nova Scotia, possesses a mine of a new and beautiful substance, analogous to coal, called Albertite, which is deserving of notice at least as one of the curiosities of our subject. It is situated at Hillsborough, on Peticodiac river, in Albert county, near the head of the Bay of Fundy. Albertite is used in the manufacture of oil and gas, yielding one hundred gallons of crude oil per ton, or 14 500 cubic feet of gas of superior illuminating power. It was discovered in 1849, and there were 56,289 tons of it exported to the United States in three years, from 1863 to 1865.

Unlike coal, it is found in a true vein, or filling a crevice in the rocks; and most authorities now agree in considering the substance as a variety of asphalt, or a solid hydro-carbon, originally fluid, like petroleum, and derived from the decomposition of vegetable or animal products. Formerly, it was regarded by different authors as a true coal, an asphaltic coal and a jet. It is a new material, intermediate between the most bituminous coals and the asphalts, and is found in the lower carboniferous formations. It has a beautiful and singular appearance, having a resplendent resinous lustre, a perfect conchoidal fracture, and it is perfectly free from mineral charcoal, and lines of impure coal or earthy matter. It is, however, divided into prismatic pieces by a great number of smooth, divisional planes, proceeding from wall to wall.

Albertite coal (or solidified petroleum, as it is sometimes improperly called), is also found in Ritchie county, West Virginia, where it is called Grahamite or Ritchie mineral.

According to official documents of Canada, the following are the shipments of Albertite, for the twelve years from 1863 to 1874:—

1863 .....	18 600 tons.	1869.....	17,000 tons.
1864.....	19,300 tons.	1870.....	6,000 tons.
1865.....	20,500 tons.	1871.....	5 500 tons.
1866 .....	20 500 tons.	1872.....	5,000 tons.
1867.....	17,000 tons.	1873.....	6 000 tons.
1868.....	12,400 tons.	1874.....	7 000 tons.
Total.....		154,800 tons.	

Calculated from the royalty paid, there were mined before the year 1863, 22,492 tons, making the total production 177,292 tons, since the discovery of the Albertite in 1849.

The marked decrease in the amount reported since 1869, has been due partly to extensive fires in the mines, and partly to a great diminution in the size of the vein. It varies from one to fourteen feet in thickness, and is placed almost vertically in the ground. It has been mined to a depth of 1,162 feet.

Recent advices report the discovery of considerable deposits of this Albertite near Memransook, Nova Scotia.

**GAS USED IN PARIS.**—The consumption of gas would appear to be continually extended in Paris. Thus, in 1857, the Parisian Company for lighting and heating by gas, sold 56,012,640 cubic metres; in 1867, 136,569,762 cubic metres, and in 1877, 191,197,228 cubic metres. The city derives a revenue usual to \$1,417,305 from the public lightings.

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COAL USED FOR GAS MAKING IN GREAT BRITAIN.

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In the most authentic estimate we have of the consumption of coal—that published a few years ago in the *Mineral Statistics*, by Mr. Hunt—the quality consumed in the manufacture of gas is set down as 6,560,000 tons yearly, and at that time our production of coal was about 114,300,000 tons. It is certain that there has been a growth in the consumption fully in proportion with the growth of the total output of coal, and there is, therefore, some basis for the belief that at the present time there is used in the gas manufacture over 7,600,000 tons of coal; and this consumption is of no small account, even in a quantity such as that to which our total output has now arisen. By the carbonisation of this coal, there would be produced 76,000,000,000 cubic feet of gas; and though there is no authentic estimate of the actual production of gas in the kingdom, yet the amount stated will probably be under the mark.

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COAL FIELDS IN PERU.—A coal bed of unknown extent has been discovered at Chala Alta, near Oluzco, in the Department of Libertad, Peru. The Government sent a scientific commission to examine the deposit, and has received a highly favorable report. The Chala coal field, will, it is estimated suffice to supply the requirements of the whole of South America, and the quality and cheapness of the coal will enable it to drive the English coal from these markets. The average consumption of coal on the coast of Peru, is estimated at 200,000 tons per annum, which at the rate of twenty-two soles per ton, gives a total of 4,400,000 soles, at present paid to England for fuel, and which Peru hopes to save by utilizing her newly discovered fields.

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NEW ZEALAND COAL.—Coal seams of considerable thickness are being worked at several places in New Zealand. In the North Island, at Kawa Kawa Bay of Islands, and Waikato; in the Southern Island, at the Grey River, Mount Rochfort, Green Island, and the Clutha Valley, in the Province of Otago, and also in Southland. Mining of brown coal, or lignite, deposits of which are scattered over all parts of the colony, though not likely, except in a few instances, to support such large mining communities as the black coal, will yet afford, in time, extensive employment. In heat-generating properties it is reported to be equal to the coal raised at the Newcastle pits in New South Wales. As a natural product derived from the decomposition of coal seams, it is proper to mention the occurrence of petroleum, or rock-oil springs in various parts of the colony, particularly at Taranaki, on the west coast, and in the vicinity of Poverty Bay, near the East Cape, in the North Island. The quality of the petroleum in the latter place is quite equal to that obtained in Canada and the United States.

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ASTURIAN COAL.—The Spanish Government proposes to use Asturian coal in future for the Spanish navy. Asturian coal has been recently analyzed by the Madrid Gas Company, and has been favorably reported upon. The Asturian coal mines produced 400,000 tons of coal in 1877.

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SOUTH AUSTRALIA.—The South Australian Government has offered a bonus of \$500,000 for the discovery of a coal field within the limits of the Province.



## PRODUCTION OF COAL IN RUSSIA.

Taking the different kinds of coal, the production of the coal basins of Russia during the years 1875 and 1876, has been as follows, expressed in pouds:—

COAL.		1875.	1876.
BASINS.			
Central Russia .....		23 658,606	20 677,346
Donetz .....		25 708 031	25,148 483
Ural .....		1,278 892	1,075 567
Poland .....		23 985,587	27 387 640
Caucasus .....		343,785	333 000
Kouznetsk .....		256,450	294 976
Kirghises Steppes .....		832 464	872 623
Sakhaline .....		95,898	122,166
Turkestan .....		392 000	298,932

ANTHRACITE.		1875.	1876.
BASINS.			
Donetz .....		25 728 732	33,174,467

LIGNITE AND BITUMINOUS SCHIST.		1875.	1876.
BASINS.			
Kiew Elisabethgrad .....		1 093 110	1 453 478
Poland .....		918 152	280 767
Caucasus .....		33,360	(?)
Turkestan .....		23,000	50,000

In 1877, the working of the Anthracite in the Olionets Government was commenced. The poud is thirty-six pounds.

ANALYSIS OF DANISH COALS.—Two varieties of Bituminous coal, from near Sudero, Denmark, were on exhibition at Paris, last year, and it was stated that by analysis, their composition was as follows:—

COMPOSITION.	I.	II.
Carbon .....	73.5	72.0
Hydrogen .....	4.2	4.8
Oxygen and nitrogen .....	21.8	23.2
Total .....	100.0	100.0

FRENCH METALLURGICAL INDUSTRY.—The production of pig iron in France, in 1877, was 1,350,393 tons, against 1,449,537 tons in 1876; 1,416,397 tons in 1875, and 1,423,307 tons in 1874. The production of rolled iron in France, in 1877, was 770,144 tons, against 848,408 tons in 1876, 904,990 tons in 1875, and 862,254 tons in 1874. The rolled iron was divided into 73,103 tons of rails, 107,452 tons of sheets, and 589,589 tons of other forms of iron. The production of steel of all kinds in 1877 was 259,971 tons, against 261,878 tons in 1876; 239,205 tons in 1875, and 217,072 tons in 1874. Of the steel product of 1877, 184,663 tons were Bessemer and Martin rails; 33,084 tons were Bessemer and Martin bar, angle and plate; 101 tons were other steel rails; 42,123 tons were cast, puddled and cemented steel.

NEW CALEDONIA.—In the Island of New Caledonia, coal has been found that yields sixty-three per cent. of fixed carbon.

**MINERAL STATISTICS OF AUSTRIA.**—The latest official statistics of the mineral and metal production of the Empire of Austria, for the year 1877, are, in metric tons:—

Iron Ore.....	1 077 402	Zinc.....	9 038
Graphite.....	23 714	Tin.....	202
Coal.....	5 480 311	Quicksilver.....	783
Lignite.....	8,771,727	Nickel.....	28
Pig Iron.....	518 072	Antimony.....	84
Lead.....	10 628	Arsenic.....	48
Litharge.....	7,004	Silver.....	54 338
Copper.....	938	Gold.....	.017

**COAL IN GERMANY.**—The production of coal in Germany, in 1877 amounted to 48,337,950 tons, against 49,588,050 tons in 1876. The production in 1874 was 46,658,000 tons. Germany is making rapid strides in the development of the coal fields of Westphalia and other portions of her territory; a result which is greatly promoted by the preference given to German coal by the German Government.

**MINERAL STATISTICS OF RUSSIA.**—The latest official statistics of the mineral and metal production of the Russian Empire, for the fiscal year of 1876, are, in tons:—

Gold.....	27 792	Coke Pig Iron.....	16,730
Silver.....	23,927	Wrought Iron.....	292 699
Platinum.....	1 576	Steel.....	17 916
Lead.....	1,168	Anthracite.....	545 037
Copper.....	3 873	Bituminous Coal.....	1 248 816
Zinc.....	4,622	Lignite.....	29,275
Charcoal Pig Iron.....	424 823	Salt.....	716,458

**FUEL FROM COAL DUST.**—From the debris of the coal mines, France makes annually 700,000 tons of excellent fuel, and Belgium 500,000 tons. In England, where there is not so much waste in coal mining, and where coal is much cheaper, the manufacture of artificial fuel is only about 200,000 tons a year. Germany makes fuel, for the most part, from peat and similar earths.

**GERMAN PIG IRON.**—The production of pig iron in the German Empire, was as follows, from 1872 to 1877, inclusive: 1872, 1,807,345 tons; 1873, 1,983,163 tons; 1874, 1,660,208 tons; 1875, 1,779,389 tons; 1876, 1,614,700 tons, and 1877, 1,566,600 tons. Prussia makes more than half the pig iron produced in all Germany.

**THE MINERAL PRODUCTION OF PORTUGAL.**—It seems that the mineral production of Portugal, so much neglected that it rarely appears in mineral statistics, has been slowly but steadily progressing within the last twenty years. The following figures (in metric tons) for the period of five years, from 1871 to 1875, are given by the Belgian Minister at Lisbon:—

Coal.....	74 054	Pyrites.....	241 278
Iron Ore.....	96 180	Lead Ore.....	10,858
Copper Ore.....	8 892	Manganese Ore.....	41,608

**COAL IN PRUSSIA.**—The production of coal in Prussia amounted in 1876 to 34,466,249 tons. In 1877, the corresponding production declined to 33,672,024 tons.

## CALORIFIC EQUIVALENTS OF PACIFIC COAST COAL.

The following is of interest, as showing the relative value of the coals found on the Pacific coast, compared with the coal from Cumberland region, in Maryland :—

	A.	B.	C.	D.	E.	F.
Alaska.....	7 94	7 96	60.0	40.0	12.3	5.41
Coos Bay.....	10 24	7.35	60 7	39 3	6.2	6.91
Seattle.....	8 38	8 57	63.0	37 0	16 6	5.71
Black Diamond.....	8 38	8 73	51.6	48 4	8 0	5.71
Bellingham Bay.....	10 58	5.51	67 0	33 0	16 0	7 21
Anthracite .....	7 40	.	95 6	4.4	7.2	5 04
Cumberland, Maryland.....	13 92	3 52	88 2	11.8	3 2	9.48

EXPLANATION.—A, heating power, one pound water; B, sulphur to ton in pound; C, coke, per cent.; D, volatile matter; E, ash, per cent.; F, relative value per pound.

**OHIO COAL AND IRON.**—The coals of Ohio are all of the Bituminous variety, and are known by various and general names, as block coal, gas coal, cannel coal, etc., and by many special names, as Mahoning Valley coal, Hocking Valley coal, Salineville coal, etc., according to the localities from which they are drawn. The best furnace coal is the block coal of the Mahoning Valley; the best coke is made from the coals at Leetonia and Washingtonville, in Columbia county; the best house coal is found in Jackson county; the best gas coal, so far as recent tests would seem to indicate, is the Barnesville coal, of Belmont county.

In the Mahoning Valley, raw coal is used in the blast furnaces in the region, with a little Connellsville coke. In the Hocking Valley, raw coal is also used. In Jackson county, raw coal from two seams, the Jackson shaft coal, and the Wellston coal is used. At Leetonia, coke is used, partly native, and partly Connellsville. At Steubenville, a mixture of coke and coal is used from the same seam—the shaft coal of the county. The Jefferson county coal is one of the most valuable in the State. Gas is made from the coals of the Mahoning Valley, the Hocking Valley, the Steubenville coal, the Ohio River coal at Bellaire and Pomeroy, and the Hanging Rock coal of Ironton.

The ores used in the manufacture of pig metal, in the Mahoning Valley, are the specular ores of Lake Superior, with a little native ore added, underlying the black band of Mineral Ridge. The native ores are used in the Hanging Rock and Hocking Valley regions. In the Hanging Rock district, a mixture of Missouri ores is used; in the Hocking Valley, some of the furnaces use a little lake ore. At Steubenville, Missouri ores are exclusively used.

**COAL IN TENNESSEE.**—The Sewanee mines, operated by the Tennessee Coal and Railroad Company, mined and shipped 87,076 tons of coal, and 97,768 tons of coke, in 1878. The Soddy coal mine shipped 24,600 tons in 1878. At Victoria, the Southern State Coal Company are producing washed coke from their excellent coal, which is being used in Nashville, Chattanooga, Knoxville and Atlanta, by founders, and meets with entire approval from the list of consumers, which is steadily growing. This excellent coke, pronounced by experts to be a most perfect article, is placed in Chattanooga, free on cars, at eleven cents per bushel—a material reduction on the price of the only foundry coke heretofore offered in this district.

## FIRST BITUMINOUS COAL DISTRICT OF PENNSYLVANIA.

The first Bituminous coal district of Pennsylvania embraces the counties of Washington, Westmoreland, Fayette, Green, Somerset, Bedford, and nearly all of Alleghany. There were two hundred and forty-four mines, employing more than ten men, of which two hundred and seventeen were in operation during the year 1878:—

Number of men employed inside the mines, estimated.....	15 190
Number employed outside, estimated.....	2,821
Estimated amount of coal produced in the whole district, in tons of 2 000 lbs .....	9 372 881
Estimated average price paid (exclusive of nut coal) for mining, per ton of 2,000 lbs.....	42 cents.
Estimated number of tons mined per miner.....	560
Number of accidents in 1878.....	93
Number of fatal accidents.....	32
Number of non-fatal accidents.....	61
Estimated amount of coal produced for each fatal accident, in tons.....	292 902
Amount for each non-fatal accident.....	153,653
Amount for each accident.....	100 801

The coke industry in this district is a most important one. There are 3,902 ovens, with a daily capacity of 241,924 bushels. They are all located at Westmoreland and Fayette counties, and ran two-thirds time upon the average.

WESTERN KENTUCKY COAL.—Probably the most persistent and uniform coal of the series is D, or No. 9; it is from four to six feet thick, averaging five feet, but contains more sulphur than *twelve* or *eleven*. It is, however, an excellent coal for grate and furnace, and gives a good coke. A lot of slack from this vein, from St. Bernard mines, Earlington, Ky., washed and coked, gave a bright, firm, coke, with only one per cent. sulphur. In some places, coals *eight* and *seven*, or E, and F, are from four to five feet thick, and of unusually good quality; but, generally speaking, the coals below *nine* are not important, until we come down to L, a hard bright coal, resembling somewhat the Indiana block coal in appearance, and giving a very similar analysis:—

	I.	II.	III.
Water.....	4.85	2.68	4.06
Volatile Matter.....	32.22	36.32	33.24
Fixed Carbon.....	55.03	53.58	51.70
Ash.....	7.90	7.42	11.06
Sulphur.....	1.37	1.80	1.67

I. From Coaltown bank, Christian county, Ky. II. Indiana block coal. III. Coal from Edmonson county, Ky.

COAL PRODUCT OF COLORADO.—A round number estimate for the entire State, based upon returns received and known production, results as follows, in tons:—

Weld County, including Erie .....	50 000
Boulder County, including Welch mine.....	120,000
Jefferson County.....	20 000
Fremont County.....	100 000
Las Animas County.....	75 000
Several small mines.....	2,000

Total output in tons.....367,000



## PRODUCTION OF ANTHRACITE IN NORTHUMBERLAND COUNTY, PENNSYLVANIA.

Mr. J. J. John, has compiled the following statement of the tonnage for 1878 :—

Cameron	Mineral R. R. & Mining Co.....	159,700 14
Mt. Carmel Shaft	P. & R. Coal & Iron Co.....	121,267 09
Luke Fidler	Mineral R. R. & Mining Co.....	103,299 09
Henry Clay, No. 1	J. Langdon & Co.....	96,998 01
Big Mountain	Patterson, Llewellyn & Co.....	92,837 10
Monitor	Geo. W. Johns & Bro.....	88,210 12
Stuartville	Wm. Montelius.....	80,442 02
Excelsior	Excelsior Coal Co.....	72,310 14
Bear Valley	P. & R. Coal & Iron Co.....	71,933 04
Locust Gap	Graeber & Shepp.....	63,970 01
Enterprise	Enterprise Coal Co.....	63,414 09
Sterling	Fulton & Kendrick.....	54,085 14
Buck Ridge	May, Audenried & Co.....	46,198 05
Trevorton	P. & R. Coal & Iron Co.....	39,892 14
Ben Franklin	Douty & Baumgardner.....	33,576 01
Locust Spring	P. & R. Coal & Iron Co. ....	34,592 11
Peerless	John Cruikshank.....	33,788 14
Hickory Ridge	Mineral R. R. & Mining Co.....	21,472 02
Black Diamond	Wm. Schwenk & Co.....	21,003 14
Lancaster	Smith & Keiser.....	8,696 13
Reliance	Thos. Baumgardner & Co.....	7,374 05
Greenback	Gorman & Toudy.....	7,132 12
Packer	D. J. Lewis.....	5,716 13
Henry Clay	J. Langdon & Co.....	3,975 15
Franklin	Lovell & Booth.....	3,444 15
Geo. Fales	P. & R. Coal & Iron Co.....	2,464 03
Carson	Philip Goodwill.....	1,444 12
Marshall	George Raup.....	10 12
Total.....		1,342,254 00

**INDIANA BLOCK COAL.**—The Seventh Annual Report of the Geographical Survey of Indiana, gives the ultimate analysis of the block coal of that State, as follows: Carbon, 82.7 per cent.; oxygen, 8.8 per cent.; hydrogen, 4.8 per cent.; nitrogen, 1.7 per cent.; sulphur, 1 per cent. Each pound of such fuel will give out 14,328 thermal units, and has, with perfect combustion, an evaporative power of 13.3 pounds of water. Water supplied at 100 deg. Fah. It should be a valuable steam coal.

**COKING BLOSSBURG COAL.**—At Arnot, Pa., the slack is washed and crushed, and then coked. It is claimed to produce a fuel that ranks with the Connellsville.

## YEARLY PRICES OF COAL.

We give below prices for Schuylkill White Ash Lump coal, on board vessels at Philadelphia, from 1834 to 1878, inclusive, prepared originally by W. G. Neilson, and continued by J. M. Swank, being the average rates obtained from sales during the year:—

Years.	Prices.	Years.	Prices.	Years.	Prices.	Years.	Prices.
1834.....	\$4 84	1845.....	\$3 46	1856.....	\$4 11	1867.....	\$4 37
1835.....	4 84	1846.....	3 90	1857.....	3 87	1868.....	3 86
1836.....	6 64	1847.....	3 80	1858.....	3 43	1869.....	5 31
1837.....	6 72	1848.....	3 50	1859.....	3 25	1870.....	4 39
1838.....	5 27	1849.....	3 62	1860.....	3 40	1871.....	4 46
1839.....	5 00	1850.....	3 64	1861.....	3 39	1872.....	3 74
1840.....	4 91	1851.....	3 34	1862.....	4 14	1873.....	4 27
1841.....	5 79	1852.....	3 46	1863.....	6 06	1874.....	4 25
1842.....	4 18	1853.....	3 70	1864.....	†8 39	1875.....	4 39
1843.....	3 27	1854.....	5 19	1865.....	7 86	1876.....	3 87
1844.....	3 20	1855.....	4 49	1866.....	5 80	1877.....	*2 59
						1878.....	3 25

\*Lowest average for year. †Highest average for year.

## THE LEGAL TON AND BUSHEL IN PENNSYLVANIA.

The Legislature of Pennsylvania have enacted in reference to what constitutes a bushel or a ton of Bituminous coal.

SECTION 1. That from and after the passage of this act, the standing weight of Bituminous coal in this Commonwealth, shall be seventy-six pounds to the bushel, and two thousand pounds shall be one ton.

SECTION 2. If any person or persons engaged in the business of mining Bituminous coal, shall fix or establish any other number of pounds by agreement or contract to be a bushel of Bituminous coal, than is provided for in the first section of this act, such person or persons shall be guilty of misdemeanor; and upon conviction thereof, shall be sentenced to pay a fine not less than five hundred, and not exceeding one thousand dollars, and all penalties recovered under this act shall be paid into the treasury of the State.

## AMERICAN RAILROAD BUILDING—1878.

The fact is worthy of record, that during 1878, there was a greater number of miles of railway built in America, than for any year since 1873. The details are given below, and are collated from the *Railroad Gazette*:—

Year.	Miles completed.	Year.	Miles completed.
1878.....	2,620	1874.....	2,025
1877.....	2,281	1873.....	3,833
1876.....	2,460	1872.....	7,340
1875.....	1,561		

During the year just ended, Minnesota built 338 miles; Iowa, 255; Colorado, 193, of which 86 were of three-foot gauge; Pennsylvania, 182; New York, 142; Texas, 118; and at the other extreme, New Jersey, but three miles; Massachusetts, six, and Arkansas, seven.

### THE READING STEAM COLLIERS.

The following table shows the voyages made, tons carried, and miles run by the Philadelphia and Reading Railroad Company's steam colliers for the year 1878 :—

Name.	Voyages.	Tons.	Miles.
Rattlesnake.....	35	17,124½	34 145
Centipede.....	39	19 792	38 011
Achilles.....	39	39 731½	34 068
Hercules.....	39	39 845	44,458
Leopard (lost).....	18	15 405	17 797
Panther.....	42	34 355	39 889
Reading.....	32	53,440½	37 052
Harrisburg.....	38	62 063½	36 157
Lancaster.....	37	59 325	37,103
Perkiomen.....	38	45 832½	35,771
Berks.....	42	25 348	38 132
Williamsport.....	36	58 582	32 688
Allentown.....	46	57 445	36 633
Pottsville.....	33	52 681½	33 052
Totals.....	504	680 972	485,181

### THE COAL TRADE OF MILWAUKEE, WIS.

We are enabled to give the trade at this city, for the year 1877 :—

Receipts by Lake, Anthracite.....	148,384 tons.
Receipts by Lake, Bituminous.....	105 256 tons.
Receipts by rail, Bituminous.....	11,144 tons.

Receipts for a series of years, by Lake :—

Year.	Tons.	Year.	Tons.
1877.....	264,784	1868.....	92 992
1876.....	188 444	1867.....	74 568
1875.....	228 674	1866.....	66 616
1874.....	177 655	1865.....	36 369
1873.....	229,784	1864.....	44,503
1872.....	210 194	1863.....	43 215
1871.....	175 526	1862.....	21 860
1870.....	122,865	1861.....	31,603
1869.....	87 690		

### QUOTATIONS OF ANTHRACITE COAL STOCKS—1878.

The following schedule will show the range for the Anthracite coal road shares, at the dates given, and the extreme fluctuations for the year 1878 :—

	Jan. 2, '78.	Dec. 31, '78.	Highest.	Lowest.
New Jersey Central.....	13¼	33¼	45¼	13½
Delaware, Lackawanna & Western.....	51	42½	61½	41
Morris and Essex.....	75½	76	89	67½
Delaware and Hudson.....	52½	38	59½	34½

## THE METRIC SYSTEM.

We give below a revised table of the metric system, which we think contains all the denominations that are necessary to express any weight or measure, however great or small. It contains only fourteen denominations, against forty in the metric system, as now taught, and more than eighty in the English system:—

## MEASURES OF LENGTH.

Millimeter (mm.).....	= 0.039371 inch.
Meter (m.)=1 000 mm.....	39.3707904 inches.
Kilometer (km.)=1000 m.....	0.62138 mile.

## MEASURES OF WEIGHT.

Milligram (mg.) .....	= 0.015432 gr. Troy.
Gram (g.)=1000 mg .....	15.43234874 gr. Troy.
Kilogram (kg.)=1000 g .....	2.20462 lb. Avoir.
Ton=1 000 kg.....	2204.62 lb. Avoir.

## MEASURES OF SURFACE.

Sq. Decimeter (sq. dm.).....	= 15.50059 sq. inches.
Sq. meter (sq. m.)=100 sq. dm.....	10.7643 sq. ft.
Hektar (hk.)=10 000 sq. m.....	2.47114 acres.
Sq. Kilometer (sq. km.) 100 hk.....	247.114 acres.

## MEASURES OF VOLUME OR CAPACITY.

Cubic Centimeter (cu. cm.).....	= 0.06103 cu. inch.
Cu. Decimeter (cu. dm.) or Liter.....	61.02705 cu. inches.
Cu. Decimeter=1,000 cu. cm.....	1.0567 quarts.
Cu. meter (cu. m.)=1,000 cu. dm.....	35.31658 cu. ft.

## STATISTICS OF LEHIGH COAL PRODUCTION.

The following is a summary of the coal tonnage produced, number of tons marketed, and the amount of coal consumed for home purposes in the Lehigh region, during the year 1878, in tons of 2,240 lbs.; furnished by T. D. Jones, Mine Inspector:—

	PRODUCTION.	SHIPMENTS TO MARKET.
Mammoth seam.....	1 435 734	1,329 383
Wharton seam.....	483 064	447 282
Buck Mountain seam.....	1 037,790	960 916
Totals.....	2 956 588	2 737 581

The amount sold at mines to employees, or used by engines raising and preparing coal, is some eight per cent., or on the total, 219,007 tons.

## COAL TRADE OF NEW YORK CANALS.

The amount of coal carried on all the State Canals, including coal sent both East and West, is furnished by the Auditor of Canals as below, in tons of 2,000 lbs.:—

	Tons 1877.	Tons 1878.
Anthracite .....	1 015 259	681 400
Bituminous .....	257 642	267 319



## COAL TRAFFIC OF THE RAILWAYS OF PENNSYLVANIA.

Amount, in net tons, of coal carried by the different railways in the State, during the year 1877 :—

NAME OF COMPANY.	ANTHRACITE.	BITUMINOUS.
Atlantic and Great Western.....	46,848	799,365
Barclay Railroad.....	.....	362,678
Bellefonte and Snow Shoe.....	76	55,766
Bell's Gap.....	.....	77,365
Buffalo Valley.....	.....	6,360
Buffalo, New York and Philadelphia.....	169,283	165,560
Catasauqua and Fogelsville.....	15,994	5,011
Corning, Cowanesque and Antrim.....	972	575,292
Delaware and Hudson Canal Co.....	1,490,718	.....
Delaware, Lackawanna and Western.....	2,468,213	9,977
Delaware Western.....	3,009	56,427
Dunkirk, Allegheny Valley and Pittsburgh.....	7,819	115,378
East Broad Top.....	1,742	97,629
Edgewood.....	.....	52,223
Huntingdon and Broad Top.....	1,357	327,645
Lake Shore and Michigan Southern.....	110,551	644,745
Lehigh and Lackawanna.....	9,769	13
Lehigh Valley.....	4,885,579	29,161
Little Saw Mill Run.....	.....	119,251
McKean and Buffalo.....	234	71,153
New Castle and Franklin.....	.....	17,525
North Pennsylvania.....	355,929	3,012
Pennsylvania coal.....	1,038,845	.....
Pennsylvania and New York Canal.....	1,021,165	340,501
Philadelphia and Reading.....	7,951,005	174,951
Pittsburgh and Castle Shannon.....	.....	78,551
Pittsburgh and Connellsville—.....	(coke 699,276)	438,792
Pittsburgh, Titusville and Buffalo.....	23,722	239,354
Reading and Columbia.....	291,009	.....
Salisbury.....	.....	83,041
Sharpsburg.....	.....	210,000
Shenango and Alleghany.....	.....	110,439
Somerset and Mineral Point.....	.....	144
State Line and Sullivan.....	25,839	.....
Stony Creek.....	3,061	.....
Tioga.....	1,401	447,071
Westchester and Philadelphia.....	.....	44,258
Western Maryland.....	.....	48,995
Wheeling, Pittsburgh and Baltimore.....	.....	2,270
Wilmington and Northern.....	50,373	37,018

Considerable of this coal is duplicated, being carried over more than one road.

## LAKE SUPERIOR IRON TRADE.

The *Marquette Mining Journal* gives the following statement in gross tons, of the aggregate product of the mines and furnaces, for each year since 1856, together with value of the same:—

YEARS.	ORE AND			VALUE.
	ORE.	FIG.	FIG.	
1856 and before.....	52,000	.....	52,000	\$ 156,000
1857.....	21,000	.....	21,000	63,000
1858.....	31,035	1,629	32,664	249,202
1859.....	65,679	7,258	72,937	575,529
1860.....	116,908	5,660	122,568	736,496
1861.....	114,258	7,970	122,228	775,832
1862.....	115,721	8,590	124,311	984,977
1863.....	185,257	9,813	195,070	1,416,935
1864.....	235,123	13,620	248,743	1,867,215
1865.....	196,256	12,283	208,539	1,590,430
1866.....	296,972	18,437	315,409	2,405,960
1867.....	466,076	30,211	496,287	3,475,820
1868.....	507,813	38,246	546,059	3,992,413
1869.....	633,238	39,003	672,241	4,968,435
1870.....	856,471	49,298	905,769	6,300,170
1871.....	813,379	51,225	864,604	6,115,895
1872.....	952,055	61,195	1,013,250	9,188,055
1873.....	1,167,379	70,507	1,237,886	11,395,887
1874.....	935,488	86,494	1,021,982	7,592,811
1875.....	910,840	81,753	992,593	5,788,763
1876.....	977,233	61,911	1,039,144	5,397,785
1877.....	960,982	29,685	990,667	4,299,598
1878.....	1,125,093	17,404	1,192,497	6,884,432
Totals.....	11,736,256	702,192	12,438,448	\$86,221,640

## THE DIFFERENT QUALITIES OF COAL.

The nomenclature used in the Final Report of the First Pennsylvania Geological Survey, in regard to the proper designation of various qualities of coal, is as follows:

## ANTHRACITE.

Hard Anthracite, that which contains two per cent. of volatile matter.

Semi, or gaseous Anthracite, that which contains ten per cent. of volatile matter.

## COMMON BITUMINOUS OR COKE COALS.

Semi-Bituminous, that which contains twelve to eighteen per cent. volatile matter.

Bituminous, that which contains eighteen to forty-eight per cent. volatile matter.

## HYDROGENOUS, YIELDING NO COKE.

Cannel coal—

Hydrogenous shaly coal—containing thirty to seventy per cent. volatile matter.

Asphaltic coal—

## ANALYSES OF EASTERN VIRGINIA COALS.

The following analyses of coal found in the Chesterfield, Powhatan, Goochland, and Henrico basins, will prove interesting:—

LOCALITY.	CARBON.	VOL. MATTER.	ASHES.
Stonehenge.....	58.70	36.50	4.80
Maidenhead.....	63.97	32.83	3.20
Heth's pit.....	62.35	37.65	2.80
Mill's and Reid's.....	57.80	38.60	3.60
Will's pit.....	62.90	32.50	4.60
Will's pit, green-hole shaft.....	67.83	30.17	2.00
Heth's deep-shaft, bottom seam.....	53.36	35.32	10.82
Heth's deep shaft, middle seam.....	66.50	23.40	5.10
Heth's deep shaft, top seam.....	61.68	23.80	9.52
Powhattan pits.....	59.87	32.33	7.80
Winterpock creek.....	65.52	29.12	5.36
Cloverhill, Appomatox R, slate coal.....	55.00	38.50	6.50
Cloverhill, mean of four.....	54.83	33.04	10.13
Richmond coal.....	59.25	32.00	8.75
Mid Lothian, Woolridge's pit.....	61.08	28.45	10.47
Mid Lothian, mean result average size coal..	53.01	33.25	14.74
Creek Coal Co., mean of six trials.....	60.30	31.13	8.57
Black Heath pits, mean of four.....	58.79	32.57	8.64
Tippecanoe pits, mean of four.....	54.62	36.01	9.37
Randolph's.....	66.15	30.50	3.35
Coalbrook Dale, second seam.....	66.48	29.00	4.52
Anderson's pit, first seam.....	66.78	28.30	4.92
Crouche's lower shaft, upper seam.....	64.60	30.00	5.40
Scott's pit.....	60.86	33.70	5.44
Waterloo shaft.....	56.20	26.80	18.00
Deep Run pits.....	69.84	25.16	5.00
Will's pit, upper vein.....	66.60	28.80	4.60
Anderson's pit, bottom seam.....	64.20	26.00	9.80

COAL TRADE OF OHIO.—The total movement of coal upon the railroads of the State of Ohio, last year, amounted to 7,480,478 tons. A proportion of this was twice reported, but it is estimated that the coal production in the State was equal to the business of 1877, or say five million tons.

DADE COAL COMPANY, GEORGIA.—The Dade Coal and Coke Works, of Dade county, Georgia. The output of these works for 1878, estimated by the superintendent, is 57,000 tons coal, and 18,000 tons coke.

QUINNIMONT COKE.—The following analysis of coke made at Quinnimont, West Va. has been recorded: Fixed carbon, 91.137; Volatile combustible matter, 2.209. Ash, 6.654.

## THE AMERICAN IRON TRADE.

We make the following extracts from the annual report of the Secretary of the American Iron and Steel Association:—

PRODUCTS, in tons of 2 000 lbs.	1875.	1876.	1877
Pig iron .....	2 266 581	2 093 236	2 314 585
All rolled iron, including nails and iron rails .....	1 599 516	1 539 269	1 476 759
All rolled iron, including nails and excluding rails .....	1 097 867	1 042 101	1 144 219
Bessemer steel rails .....	290 863	412 461	432 169
Iron and all other rails .....	501 649	467 169	332 540
Street rails, included in iron rails .....	16 340	13 086	7 015
Rails of all kinds .....	792 512	870 629	764 709
Kegs of cut nails and spikes, included in all rolled iron .....	4 726 881	4 157 814	4 828 918
Crucible cast steel .....	39 401	39 282	40 430
Open-hearth steel .....	9 050	21 490	25 031
All other steel, except Bessemer .....	12 607	10 306	11 924
Bessemer steel ignots .....	375 517	525 996	560 587
Blooms from ore and pig iron .....	49 243	44 628	47 300

## COAL AND COKE OUTPUT OF TENNESSEE.

Mr J. B. Killibrew, forwards the following statement of coal and coke produced in Tennessee in 1877-78—in bushels:—

	1877.	1878.
Sewanee coal .....	2 670 416	2 167 650
“ coke .....	2 066 514	2 444 218
Battle Creek coal .....		167 000
“ “ coke .....		3 500
Coal Creek coal .....	2 430 700	1 364 450
Rockwood furnace .....		1 500 000
Soddy mines coal .....	342 500	469 165
All other coal mines .....		500 000

## THE PRODUCTION OF ANTHRACITE, LIVES LOST, &amp;c.

The report of the Inspectors of Mines, for 1877, give the following statistics:—

	I.	II.	III.	IV.	V.	VI.
Tons coal mined .....	4 070 015	4 030 327	4 808 208	4 865 467	3 471 562	1 530 780
Tons produced per life lost .....	156 539	107 377	120 205	115 317	123 982	54 510
Persons employed in and about the mines .....	9 216	14 073	16 312	10 537	10 857	5 847
Number of fatal accidents .....	26	38	40	33	23	29
Number of non-fatal accidents .....	60	121	174	58	66	111

I—South District of Luzerne and Carbon Counties. II—Middle District, Luzerne County. III—Eastern District, Luzerne County. IV—Second or Shenandoah District. V—Third or Shamokin District. VI—First or Pottsville District.

MOUNT DIABLO COAL.—The production of Mount Diablo coal, during 1878, was as follows:—

Black Diamond mines .....	63 373 tons.
Pittsburgh mines .....	32 026 tons.
Empire mines .....	27 015 tons.



## THE WILMINGTON (BRAIDWOOD) COAL OF ILLINOIS.

What is known as Wilmington coal, is found in Will and Livingston Counties ; this is the cheap steam coal of Chicago ; it is mined at and near Braidwood, some 53 miles south of Chicago, on the Chicago and Alton railroad, the seam averaging three feet in thickness. The amount produced in 1875 was 512,800 tons ; 510,533 tons in 1876 ; for 1877, the output was only 289,126 tons, (there being a lock-out of the mines, from April to December, eight months) ; for 1878, 531,629 tons divided as below :—

Chicago, Wilmington & Vermillion Coal Co.....	214,882 tons
Eureka Coal Co.....	118,321 “
Star Mining Co. of Coal City.....	64,635 “
Wilmington Coal Mining & Manufacturing Co.....	63,143 “
Baird, Hickox & Co. (6 months).....	18,406 “
Braidwood Coal Co.....	20,000 “
Bruce Coal Co.....	32,242 “

The results of analyses of this coal are given below :—

	I.	II.
Fixed carbon.....	47.405	47.939
Volatile matter.. ....	39.642	39.761
Water.....	6.981	7.013
Ash.....	5.972	5.287

## COAL DISCOVERY AT AURORA, NEVADA.

Local papers claim that there has been discovered a genuine Bituminous coal vein about eighteen miles north of Aurora, Nevada, in what is known as Coal Valley. “The discovery promises well and the proprietors are quite jubilant over what they consider the best indications which have yet been uncovered in the valley. The vein at a depth of seven feet shows between six and seven feet thick of a bright, clear-looking coal, which, in the more solid places, sparkles like the Black Diamond coal of Mount Diablo. Samples were brought into town a few days ago, and several trials were made as to its quality. A fire was made in a blacksmith's forge of about three shovels full of the coal, and a heat gotten up sufficient to weld two pieces of iron one inch in diameter. Several experiments were made with it ; among others the welding of a toe-calk on a horse-shoe, as great, if not greater, than any heat required in the business ; and that as this coal did that satisfactorily, it has all the qualities essential for its use in a forge. It lights tolerably easy ; and a fire made with it in the open air burned brightly and steadily, leaving no slag. Sufficient depth has not yet been attained on the vein to determine its full value, but enough is known to warrant the owners in putting men at work to sink a shaft and run drifts in different directions with the the intention of exploring the vein more thoroughly.”

**COKING MISSOURI COAL:**—Coal has been found near Joplin, Mo., that makes an excellent coke, and a very good demand exists for it from the smelting works in the vicinity.

## ANALYSES OF ILLINOIS COALS.

DESIGNATION.	Water.	Ash.	Volatile matter.	Fixed carbon.
Bloomington, McLean Co. ....	7.90	4.96	34.02	53.12
Briar Bluff, Henry Co. ....	12.60	9.90	28.96	48.54
Barclay, Sangamon Co. ....	10.80	17.10	27.32	44.78
Carbondale, Jackson Co. ....	6.36	7.40	26.40	59.84
Catlin, Vermillion Co. ....	7.80	12.70	31.08	48.42
Danville, Vermillion Co. ....	9.60	14.64	31.20	44.56
DuQuoin, Perry Co. ....	8.86	7.00	23.54	60.60
Elmwood, Peoria Co. ....	7.60	9.50	27.60	55.30
Farmington, Fulton Co. ....	8.52	11.72	29.28	50.48
Grape Creek, Vermillion Co. ....	9.74	10.60	28.34	51.32
Kewanee, Henry Co. ....	15.60	7.14	27.60	49.66
Lincoln, Logan Co. ....	10.92	14.84	27.60	46.64
Lombardville, Stark Co. ....	9.42	7.46	31.38	51.74
Mt. Carbon, Jackson Co. ....	6.12	2.70	24.68	66.50
Oglesby, LaSalle Co., 2d vein. ....	12.12	7.72	30.84	49.32
Oglesby, LaSalle Co., 3d vein. ....	10.06	3.72	30.34	55.88
Peru, LaSalle Co., 2d and 3d veins	10.30	4.54	33.90	51.26

## DELAWARE AND MARYLAND SHIP CANAL.

This project is of great interest to the coal operators of Maryland, and the consumers of coal along the Atlantic seaboard. We give an epitome of the routes proposed: One is by making the Choptank River, which enters the Chesapeake Bay below Cambridge, about fifty miles from Baltimore, a part of the proposed canal as far as Indian Creek; from there running directly across to the northwest fork of the Nanticoke, and then in a direct line to Broadkilm Creek, about three miles above the Breakwater. This route is estimated to be about forty miles across. By another route it is proposed to strike the St. Michael River, which is about forty miles from Baltimore, at Royal Oak, and from there go to the Choptank River, to a point above Lord's Landing, and then to Cabin Creek, from which the line will be run directly across the Broadkilm Creek, on the Delaware Bay. A third route proposed is from the Sassafra River, which is about thirty miles from Baltimore, across to Deep Water Point, making use of Blackbird Creek, the distance across which is about thirty miles. The most direct route seems to be the Chester River route, which runs from Baltimore to Queenstown, twenty-eight miles, and then directly to Broadkilm Creek on the Breakwater, a distance of fifty-five miles. This is the longest land route, but it makes the most direct line, and is considered the most desirable. It is claimed that a canal, by connecting the Chesapeake and Delaware bays, will shorten the distance from Baltimore to the ocean, about two hundred miles, and that the foreign commerce of Baltimore, and also of New York and Philadelphia, will be greatly benefitted thereby.

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## COAL WASHING BY MACHINERY.

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Within the last ten years, the art of dressing coal and ore has made great progress. By improved appliances, material formerly entirely or almost valueless, is cleaned of its impurities and made available for industrial uses. Foremost among the machines to which these results are due, are the jigs. The principle upon which the operation of jigs is based, is as follows:—Mixtures of particles of varying densities falling in water, separate in layers according to their specific gravity. This is effected in a continuous manner in jigs by the action of a piston, which forces water through a layer of the material to be cleaned, spread out on a sieve. As coal is lighter than the impurities it contains, pure coal forms the uppermost layer on the jig.

Coal-washing or separating of the carbon from the impurities, previous to its use, or its manufacture into coke, has been for a long time an important branch of the Iron Industry. The attention of many manufacturers has already been directed to the subject, and this because of the remarkable results obtained from the prepared fuel.

Many blast-furnace companies have at their disposal large quantities of coal which they cannot use, it being mixed with too great an amount of impurities and foreign elements, that not only reduce its caloric power, but exercise a deleterious influence upon the quality of the article manufactured. Among these elements "Sulphur" and "Phosphor" are the worst enemies to the iron-worker. Both are found in nearly all the coals. The former exists in different forms, but most frequently as bi sulphide of iron or "Iron pyrites," and as sulphate of lime or "Gypsum," while the latter occurs as "Phosphoric acid."

MR. S. STUTZ, of Pittsburgh, has patented an apparatus for the purpose of coal washing that has been used in Pittsburgh, and other parts of Pennsylvania; in Alabama, Tennessee, and Colorado.

With an apparatus having two sieves of from 25 to 30 square feet surface, from 5 000 to 10,000 bushels, or from 200 to 400 tons of slack coal may be easily washed in one day. The amount of water necessary, varies from 25 to 35 gallons per bushel of coal, according to the amount of impurities contained in the material. The cost of separating bituminous coal from sulphur or slate, varies from 1 to 4 cents per ton, while the separation of anthracite coal from slate can be done for less than one cent per ton.

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LOISEAU'S ARTIFICIAL FUEL:—No one has done more to keep the question of utilizing anthracite waste before the world, than E. F. Loiseau, of Philadelphia. He has expended many years time, and large amounts of money, in this endeavor. The idea with him has been to make egg-shaped lumps, weighing but a few ounces, for domestic use. Although as yet there has been no commercial success to his efforts in this direction, it is hoped that before long he may reap a reward commensurate with his labors. The low price of anthracite coal as sent to market from the mines, makes profit on artificial fuel for domestic use, somewhat doubtful. With an adaptation of this process to sizes of value for steam raising it would be a commercial success without doubt. The process is well-known, and needs no repetition in this work.

## COAL TRADE OF THE UNION.

We give below the tonnage for the year 1869, as per census reports made in 1870, together with figures for the year 1878, where available: in other cases, we have made a careful estimate based upon our reports of the trade in the various States:—

	1869—tons.	1878—tons.
Pennsylvania Anthracite.....	13,866,180	17,605,262
Pennsylvania Bituminous.....	7,798,517	13,500,000
Illinois.....	2,629,563	3,500,000
Ohio.....	2,527,285	5,000,000
Maryland.....	1,819,824	1,679,322
Missouri.....	621,930	900,000
West Virginia.....	608,878	1,000,000
Indiana.....	437,870	1,000,000
Iowa.....	263,487	1,500,000
Kentucky.....	150,582	900,000
Tennessee.....	133,418	375,000
Virginia.....	61,803	75,000
Kansas.....	32,938	300,000
Oregon.....	.....	200,000
Michigan.....	21,150	30,000
California.....	.....	600,000
Rhode Island.....	14,000	14,000
Alabama.....	11,000	200,000
Nebraska.....	1,425	75,000
Wyoming.....	50,000	100,000
Washington.....	17,844	150,000
Utah.....	5,800	60,000
Colorado.....	4,500	367,000
Total.....	31,116,595	49,130,584

## COAL TRADE AT LOUISVILLE, KY.

Consumption of coal during the year 1878:—

COAL,	BUSHEL.	COKE,	BUSHEL.
Pittsburgh.....	11,300,000	Connellsville.....	420,000
Ohio River.....	1,360,000	City made.....	140,000
Kentucky.....	1,670,000	Gas coke.....	380,000
Total.....	14,330,000	Total.....	940,000

Total coal and coke, 15,270,000 bushels, or in tons, 610,400 tons of 2,000 lbs.



## ARTIFICIAL FUEL FROM ANTHRACITE.

The Anthracite Fuel Company made during the season of 1878, something over 36,000 tons of fuel from the waste of Anthracite coal, or more than double the quantity made in 1876, the first year of operations. The distribution was to several railway companies for locomotive steaming purposes besides smaller quantities for manufacturing purposes. The price at which the product was sold in 1878, averaged \$3.45 per ton, at the works. The price this season will be much lower, but it is expected that even a larger quantity will be marketed; the capacity of the present works is 45,000 tons per season. As this is the only concern that has made a commercial success of the manufacture of fuel from Anthracite waste, it is worthy of notice in this work. The company, whose works are located at Port Ewen, on the Hudson River, are working under the Endres patents, of which they are the exclusive owners. The material is a pitch to the extent of ten per cent. and Anthracite waste. After the raw materials have been thoroughly mixed, it is forced into the pockets of the mold table, a large horizontal wheel, moving at the speed of  $2\frac{1}{2}$  revolutions per minute, and containing ten molds or pockets,  $6 \times 10 \times 4\frac{1}{2}$  inches, at the bottom of each of which is a moving piston or "plunger." As the molds are filled, the pistons pass over a movable incline capped for a wearing surface with Chrome steel of a very fine grain, selected with special reference to resisting frictional wear, and also affording great tensile strength. The incline rests on a lever which runs through to the center of the machine, and is itself held in suspension by a heavy rod, which is itself held at the top of the machine by four heavy rubber springs ten inches in diameter, thus securing what has so long been sought, a system of adjustable pressure; for no matter what the consistency of the material, these springs will yield to the point desired to allow the passage of the pistons. Great risk of breakage is thereby obviated. A pressure of thirty thousand pounds is thus safely secured. As the pistons pass over the incline, they press upward against the pressure plate, the wearing surface of which is lined with a fine grade of black diamond steel. This gives them their shape and solidity, and the operation of filling and pressing is continuous. As the molds emerge from under the pressure plate, the pistons suddenly move up another incline which brings the block of coal flush with the surface of the molding table, from which they are speedily swept off by a movable bar on to a carrier composed of an endless positive transmission chain. The carrier, sixty-five feet long, delivers its load in regular order at the side of the dock where it falls into the hands of men, four at each belt, who at once stow it in regular tiers, on board the boats. The blocks of coal are brick shaped, weigh about 14 lb. each, and are hard enough to handle and stow when they emerge from the table.

The process is thus automatic and continuous, without the intervention of any labor in handling material, from the time the culm is taken out of the boats by the elevator on one side of the dock until the manufactured product is delivered into the boat on the other side.

**YOUGHIOGHENY GAS COAL:**—Among the most popular coals for gas-making is that from the Youghioghenny region in Pennsylvania. Wherever it has been used it stands unrivalled.

## COAL TRAFFIC OF THE PENNSYLVANIA RAILROAD.

DISTRICT.	YEAR. 1878.	YEAR. 1877.	YEAR. 1876.
Anthracite.....	697,704	694,180	687,172
East Broad Top .....	63,068	54,738	65,999
Huntingdon and Broad Top.....	76,826	87,905	44,461
Cumberland.....	167,608	189,394	147,512
Snow Shoe.....	29,168	42,985	50,916
Tyrone and Clearfield .....	1,270,612	1,340,744	1,190,413
Gallitzin and Mountain region.....	200,099	184,464	209,315
West Pennsylvania Railroad .....	186,308	187,345	173,324
“ “ Coke.....	80,994	58,483	57,797
Southwest Pennsylvania Railroad .....	25,663	39,010	157,150
“ “ Coke.....	726,805	635,990	539,640
Westmoreland region.....	692,586	786,039	896,590
“ “ Coke.....	78,766	64,905	59,462
Pittsburgh region.....	1,429,438	1,374,396	1,310,846
“ “ Coke.....	128,918	107,840	162,126
D. H. & W. Anthracite.....	72,440	94,685	95,434
Lewisburg Anthracite.....	1,753	10,789	8,863
Total in tons of 2,000 lbs.—coal.....	3,920,766	4,086,674	4,018,159
Total in tons of 2,000 lbs.—coke.....	1,085,990	867,213	819,125

STATISTICS OF BITUMINOUS AND SEMI-BITUMINOUS  
COAL PRODUCTION OF PENNSYLVANIA, IN 1878.

IN TONS OF 2,000 lbs.

Blossburg.....	652,597
Barclay.....	314,320
McIntyre.....	154,205
Total Northern Pennsylvania region.....	1,121,123
Broad Top.....	150,224
East Broad Top.....	123,068
Snow Shoe.....	29,168
Clearfield.....	1,295,201
Total Central Pennsylvania region.....	1,597,661
Allegheny Mountain.....	200,099
West Pennsylvania Railroad .....	294,300
Southwest Pennsylvania Railroad.....	1,074,736
Westmoreland.....	797,607
Pittsburgh.....	1,601,328
Johnstown Iron Works.....	250,000

Total West Pennsylvania region on P. R. R..... 4,218,070  
 Coke added in, and allowance made for loss in coking.

## AUTOMATIC STOKING.

There can be no doubt that the adaption of automatic or mechanical firing has great advantages over hand firing or stoking. Many devices have been patented in Great Britain, and one at least in the United States. By the use of mechanical stokers the generation of steam, from a given boiler capacity, has been increased twenty-five per cent. The fuel is more thoroughly consumed, and the smoke nuisance is effectually prevented. Altogether it is conceded that the automatic stoker forms the best known appliance for fulfilling the conditions required for the perfect combustion of both the solid and gaseous portions of the fuel. The machine patented in the United States, that has attracted attention, is the invention of Dillwyn Smith, and we are informed that it is now in use at various points from Rhode Island to Maryland. It is difficult to conceive a more admirable arrangement for the constant and equable distribution of the fuel over the entire grate surface of a furnace, and this with the fire doors closed; so that besides the perfectly even distribution of the fuel, the evil consequence of frequently opening the fire doors, as when the fuel is supplied by hand, is avoided. To appreciate the benefit of such firing as this stoker accomplishes, one need but stand in the fire-room, where they are in use; the temperature is materially lessened. These stokers are now in such demand in England, despite the 'hard times' that have lately prevailed, that there have been over 2,000 of them erected since their introduction. The great satisfaction they give and their value is evidenced from this fact.

We must confess to some surprise that these machines have not been introduced into the Western States, where the almost exclusive use of Bituminous coal would render them especially desirable: their use would prevent effectually the formation of that black smoke which is such a nuisance in some of our fine western cities. An energetic company might do some good to their fellow citizens and themselves by taking hold of this subject in a business way.

The entire upper part consists of a hopper for the reception of coal; connected with the lower portion of this hopper there is a cylinder enclosing a feeding screw, which carries the coal and drops it equally on two discs, revolving in opposite directions, and enclosed in a box with an aperture towardst he furnace. The discs throw the fuel into the furnace and spread it equally over the bars. The feed is regulated to supply the exact quantity required through the adjustment of the screw. Special fire-doors, constructed on the most approved principles, for the admission of the exact quantity of air required, are also supplied.

## WESTERN KENTUCKY COAL FIELD.

The production during the year 1878, was as below :—

Mines on Evansville, Henderson & Nashville R. R.....	163,698 tons
Mines on Paducah and Elizabethtown R. R.....	190,000 "
Mines on Green River .....	80,000 "
Mines on Ohio River, below Green River.....	84,000 "
Mines on Ohio River, above Green River.....	50,000 "

Grand total..... 567,698 tons

Price for mining 2 1-2 cts. per bushel. No strikes or troubles of any importance. Price of coal at the mines, lump, 3 1-2 to 5 cts. per bushel; nut coal, 1 to 3 cts per bushel.

## ANALYSES OF INDIANA COALS.

The following analyses will serve to show the character of some of the Indiana coals; they are compiled from the Geological report by Prof. E. T. Cox:—

	FIXED CARBON	VOL. MATTER.	WATER.	ASH.
Fountain County.....	54.5	36.0	5.0	4.5
Vanderberg County.....	48.5	42.0	3.5	6.0
Warwick County.....	49.5	41.5	3.5	5.5
Posey County.....	51.0	39.5	4.0	5.5
Sullivan County.....	55.0	40.0	3.5	1.5
Daviess County.....	53.5	36.0	5.5	5.0
Vermilion County.....	46.0	44.0	5.5	4.5
Parke County.....	46.5	46.0	4.0	3.5
Montgomery County.....	52.0	41.5	3.0	3.5
Clay County.....	61.5	32.5	3.5	2.5
Owen County.....	57.5	38.5	2.0	2.0
Greene County.....	63.0	29.5	7.0	0.5

## ANTHRACITE ON HAND, IN 1878, AT TIDE-WATER.

Date.	Tons.	Date.	Tons.
January 1.....	685,186	July 27.....	552,376
February 2.....	715,612	Aug. 31.....	710,688
March 2.....	645,938	Sept. 28.....	546,583
March 30.....	536,464	Nov. 2.....	435,631
April 27.....	511,819	Nov. 30.....	446,068
June 1.....	442,881	Dec. 31.....	504,377
June 29.....	493,523		

## ANTHRACITE COAL TONNAGE OF ERIE RAILWAY INTEREST.

Year.	Tons.	Year	Tons.
1871.....	55,596	1875.....	303,039
1872.....	83,288	1876.....	230,709
1873.....	36,728	1877.....	175,095
1874.....	197,562	1878.....	278,132

This coal represents productions of mines owned or operated by the Erie Railway Company: the statistics have usually been grouped with the Lehigh Valley report.



## ANTHRACITE OUTPUT—PERCENTAGE OF REGIONS.

The aggregate amount of Anthracite marketed foots up 360,645,034 tons from 1820 to 1878, inclusive. Mr. J. H. JONES kindly furnishes us with a statement, giving the yearly tonnage of each region, and the percentage each year of each region. We take the sum total at the beginning of the year 1871, as 207,110,920 tons, and add the following details since that date:

Year.	Schuykill.	P. C.	Lehigh.	P. C.	Wyoming.	P. C.	TOTAL.
1871	6,552,772	41.74	2,235,707	14.24	6,911,242	44.02	15,699,721
1872	6,694,890	34.03	3,873,339	19.70	9,101,549	46.27	19,669,778
1873	7,212,601	33.97	3,705,596	17.46	10,309,755	48.57	21,227,922
1874	6,866,877	34.09	3,773,836	18.73	9,504,408	47.18	20,145,121
1875	6,281,712	31.87	2,834,605	14.38	10,596,155	53.75	19,712,472
1876	6,221,934	33.63	3,854,919	20.84	8,424,158	45.53	18,501,411
1877	8,195,042	39.35	4,332,760	20.80	8,300,377	39.85	20,828,179
1878	6,282,226	35.68	3,237,449	18.40	8,085,587	45.92	17,605,262

COAL AND COKE FROM UTAH.—The following analyses have been recorded of coal and coke from Southern Utah :—

CONSTITUENTS.	COAL.	COKE.
Volatile Matter.....	40.61	2.70
Fixed Carbon.....	48.21	94.05
Ash.....	1.88	3.25

ERIE, PA.—The amount of coal received at this port, of all kinds, aggregates 500,000 tons annually. About one-half is Anthracite coal. The shipments up the Lake amount to 250,000 tons. There is a large business done in the transfer of coal to box cars going west. This is altogether Anthracite coal. Details of the business of 1878, have not been received.

## COAL OUTPUT OF HOCKING VALLEY, OHIO.

The coal tonnage of the Hocking Valley in Ohio for 1878, was as follows: Shipped by rail, 1,086,245 tons; blast furnace consumption, estimated, 160,000 tons; other local consumption, estimated, 50 000 tons; total, 1,296 245 tons. This is one fourth of the entire coal product of the State. Although only established since the panic of 1873, the output of the region, mined exclusively from the "great seam," No. VI of the Geological survey, has been :—

YEAR.	C. & H. V. R.	N. S. & S. R.	Total.
1870.....	50,000	.....	50,000
1871.....	250,000	.....	250,000
1872.....	600,000	53,000	653,882
1873.....	804,000	288,687	1,032,687
1874.....	480,076	170,728	650,804
1875.....	752,930	206,243	1,019,173
1876 ..	782,286	178,065	969,351
1877...	800,795	238,695	1,039,490
1878.....	914,000	122,245	1,036,245

TABLE FOR COMPUTING THE PRICE OF COAL.

Lbs.	\$3.50	3.75	4.00	4.25	4.50	4.75	5.00	5.25	5.50	5.75	6.00
10	.02	.02	.02	.02	.03	.03	.03	.03	.03	.03	.03
20	.04	.04	.04	.05	.05	.05	.05	.06	.06	.06	.06
30	.05	.06	.06	.07	.07	.07	.08	.08	.08	.09	.09
40	.07	.07	.08	.09	.09	.10	.10	.11	.11	.12	.12
50	.09	.09	.10	.11	.12	.12	.13	.13	.14	.15	.15
60	.10	.11	.12	.13	.14	.15	.15	.16	.17	.18	.18
70	.12	.13	.14	.15	.16	.17	.18	.19	.19	.20	.21
80	.14	.15	.16	.17	.18	.19	.20	.21	.22	.23	.24
90	.15	.17	.18	.19	.20	.22	.23	.24	.25	.26	.27
100	.17	.19	.20	.22	.23	.24	.25	.27	.28	.29	.30
200	.35	.37	.40	.43	.45	.48	.50	.53	.55	.58	.60
300	.52	.56	.60	.64	.68	.72	.75	.79	.83	.87	.90
400	.70	.75	.80	.85	.90	.95	1.00	1.05	1.10	1.15	1.20
500	.87	.94	1.00	1.07	1.13	1.19	1.25	1.32	1.38	1.44	1.50
600	1.05	1.14	1.20	1.28	1.35	1.43	1.50	1.58	1.65	1.73	1.80
700	1.22	1.32	1.40	1.49	1.58	1.67	1.75	1.84	1.93	2.02	2.10
800	1.40	1.51	1.60	1.70	1.80	1.90	2.00	2.10	2.20	2.30	2.40
900	1.57	1.70	1.80	1.92	2.03	2.14	2.25	2.37	2.48	2.59	2.70
1000	1.75	1.88	2.00	2.13	2.25	2.38	2.50	2.63	2.75	2.88	3.00
1100	1.92	2.07	2.20	2.34	2.48	2.62	2.75	2.89	3.03	3.17	3.30
1200	2.10	2.25	2.40	2.55	2.70	2.85	3.00	3.15	3.30	3.45	3.60
1300	2.27	2.44	2.60	2.77	2.93	3.09	3.25	3.42	3.58	3.75	3.90
1400	2.45	2.62	2.80	2.98	3.15	3.33	3.50	3.68	3.85	4.03	4.20
1500	2.62	2.81	3.00	3.19	3.38	3.57	3.75	3.94	4.13	4.32	4.50
1600	2.80	2.99	3.20	3.40	3.60	3.80	4.00	4.20	4.40	4.60	4.80
1700	2.97	3.18	3.40	3.62	3.83	4.04	4.25	4.47	4.68	4.89	5.10
1800	3.15	3.37	3.60	3.83	4.05	4.28	4.50	4.73	4.95	5.18	5.40
1900	3.32	3.56	3.80	4.04	4.28	4.52	4.75	4.99	5.23	5.47	5.70

## COAL TRADE OF ALABAMA.

The analyses below are of interest and value :—

Component Parts by Analysis.	Cahaba Level Bed.	Cahaba Mulberry Creek.	Cahaba.	Warrior. Southern End.
Volatile matter.....	35.51	36.68	34.49	40.60
Fixed carbon.....	57.42	57.23	60.09	54.07
Ashes.....	6.31	5.30	4.32	3.09
Moisture.....	.76	.79	.93	1.18
Sulphur.....	Trace	Trace	.17	1.06

Production has been as below :—

On the line of	1874.	1875.	1876.	1877.	1878.
South and North R. R.....	33,139	57,516	76,140	139,182	162,601
Selma and D. R. R. ....	14,750	14,890	20,500	22,500	19,167
Alabama Gt. Southern .....	2,000	2,500	5,000	9,000	10,000
Other roads and wagon delivery .....	.....	1 000	1,000	1,500	2,500
Total—tons of 2,000 lbs.....	49,889	75 806	102,640	172 182	194,268

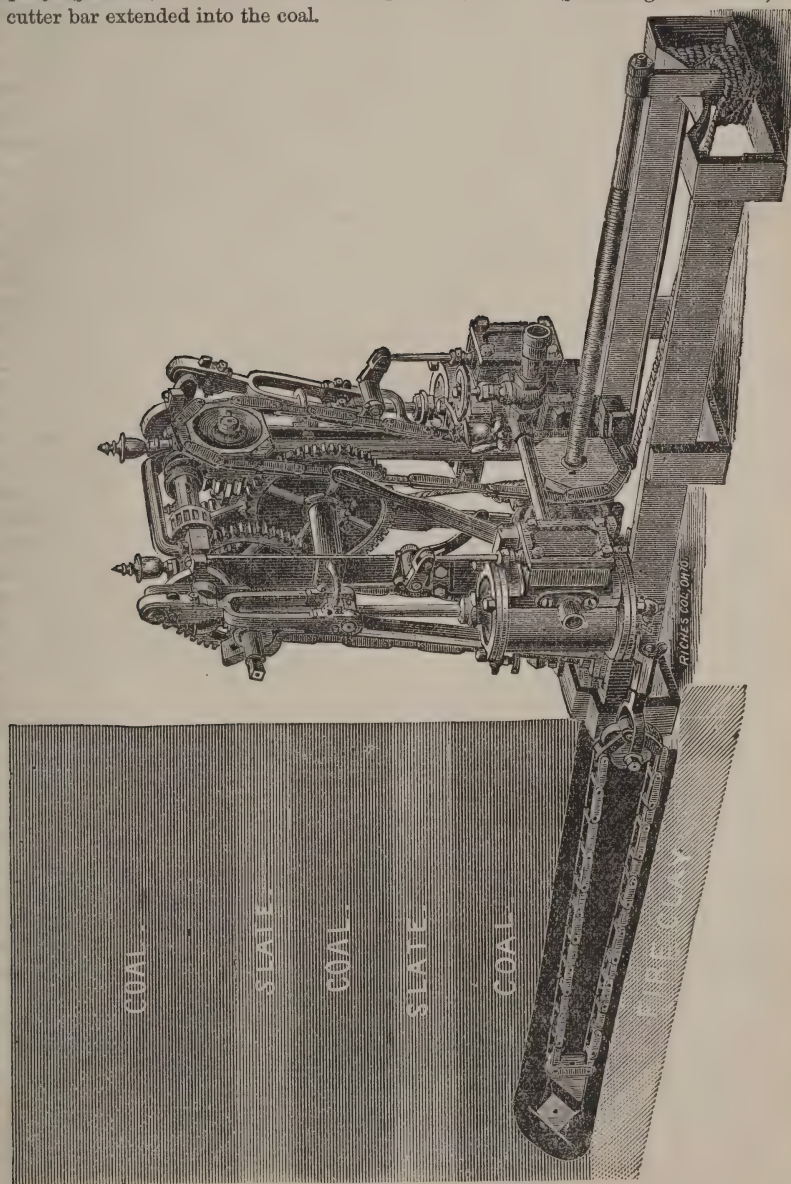
## COAL CUTTING BY MACHINERY.

A large number of manufacturers, and a still larger number of householders, are totally ignorant of the great amount of handling to which coal is subject before it reaches their furnaces or fire-places, and especially of the very onerous labor in "getting" it—that is, to detach it from the body of the solid coal, as found at varying depths below the surface of our earth. The heaviest operation in the "getting" of the coal is to undercut it, which the miner usually has to do with his pick, and in a stooping, and frequently very cramped, position. The amount of coal which is wasted, or more correctly speaking, which is made into small pieces of dust, where undercutting is done by hand, is necessarily large, on account of the space required for the pick and the hands and arms of the miner. Because of this waste, and the expense of undercutting, as well as for humanitarian reasons, we are always pleased at seeing earnest attempts made to supersede this operation in coal-mining.

Of the more recent inventions for utilizing machinery for the purpose of cutting coal, that of Mr. F. C. LECHNER, of Columbus, O., deserves attention, and forms the subject of this notice. The essential features of this machine are the cutter bar and the modes of driving it; for whereas in most mining machines hitherto brought out, the cutter, or cutters, have been driven in a horizontal plane, the cutters in this case revolve in a vertical plane. The form of the axle is square, as shown, and to it are bolted the cutters, resembling in this respect very much the axles used in wood-cutting machinery. At two places upon the axle the narrow journals are formed, and are laid in suitable brass bearings in ends of the wrought-iron framing to which the driving machinery is fixed. Motion is communicated to the axle by a couple of pitch chains, which not only drive by contact with the axle itself, but also by engaging a set of narrow cutters, which enter the open portions of the chain. In this manner only thin films of coal are left uncut where the chains work, and get broken off quite imperceptibly by coming in contact with the links of the chain. By keeping the bearings of the cutter-bar as narrow as practicable, and arranging the cutters close to the framing, also the very little coal left uncut here gets similarly broken off by the advancing framing. The dust produced in cutting is carried away partially by the two driving chains already mentioned, and partially by another set of chains working at the two sides of the machine, as shown. In addition to the wrought-iron bars, which, as we have explained, form the framing to which the cutter-bar and the driving-gear are attached, another set of similar bars at the side of them form the stationary framing on which the whole machine slides. The forward motion is given by means of a stationary screw, round which a nut revolves, and this motion is arrested by moving a handle which separates the two halves of the nut in a similar way as the screw and nut are disconnected in most screw-cutting lathes. To bring the machine back again a bolt, attached to the stationary framing, is, by means of a handle, thrown into gear with one of the pitch chains, which are kept revolving to clear away the dust—although at a much slower pace than when the cutting takes place. Suitable means are provided for taking up the slack of the pitch chains when under wear takes place, but this is minimised by making them, as well as many other parts of the machine, of steel. Either steam or compressed air can be used for driving, but the means by which the motion is communicated from the pair of cylinders to the pitch chains and to the feed-nut possess no especial interest, and we need therefore, not describe them. The machine only weighs 750 lbs. complete, and can be handled by two men, so that it is unnecessary to lay down rails for



it. It can either drive an entry, work in pockets, or on the long-wall system. The accompanying sketch, shows the machine in operation, from a quartering rear view, with the cutter bar extended into the coal.







# THE COAL TRADE,

A Compendium of Valuable Information

RELATIVE TO

Coal Production, Prices, Transportation, Etc, Etc.

AT HOME AND ABROAD,

WITH

Many Facts Worthy of Preservation for Future Reference,

CORRECTED TO THE LATEST DATES.

BY

FREDERICK E. SAWARD,

Editor of "THE COAL TRADE JOURNAL."

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1880.

PUBLISHED AT 111 BROADWAY, NEW YORK.

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SEVENTH CONSECUTIVE YEAR OF PUBLICATION.

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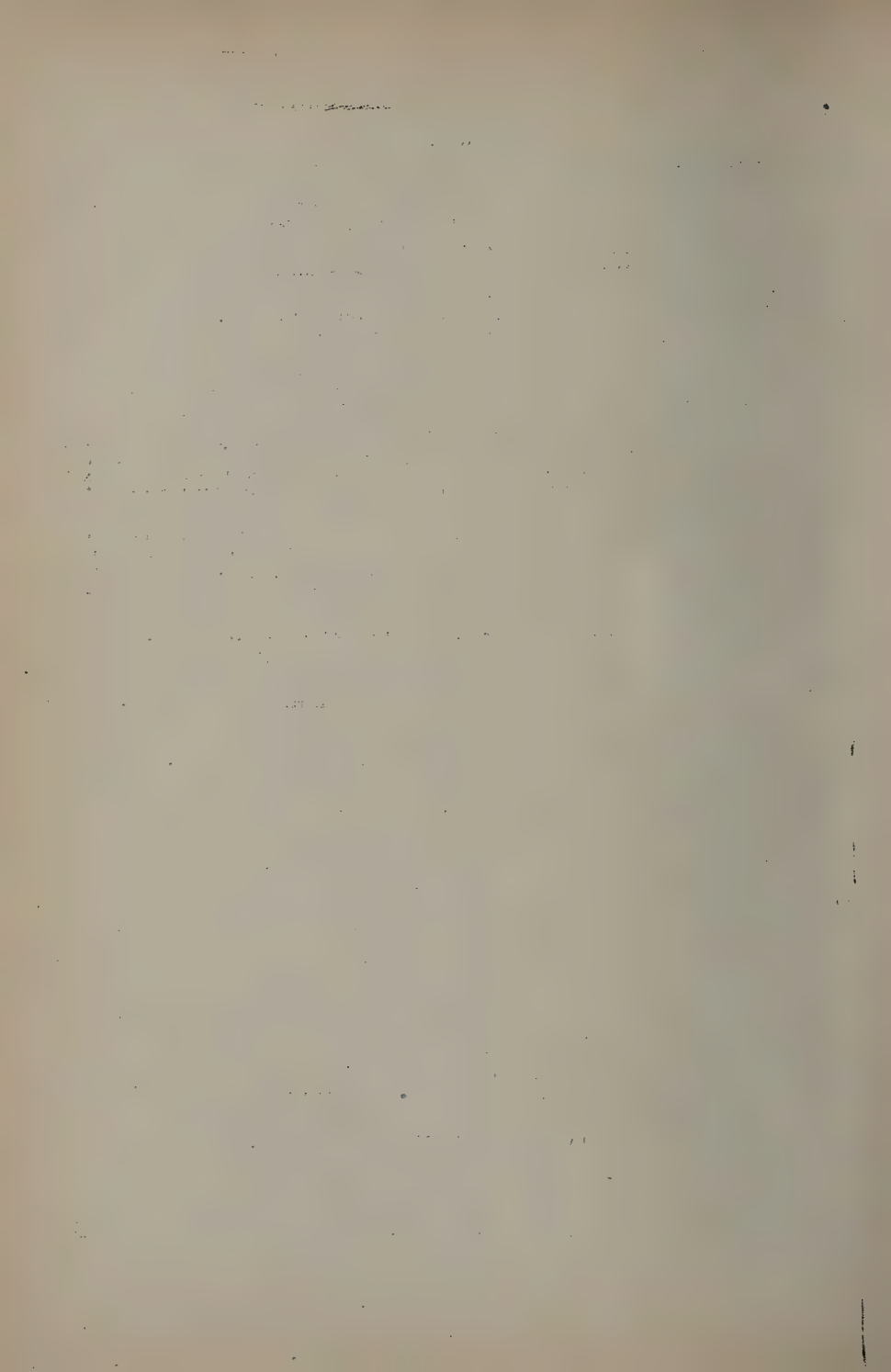
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# THE COAL TRADE.

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## INTRODUCTION.

We have pleasure in presenting the seventh Annual Review of the Coal Trade, at home and abroad. In its pages will be found many new and interesting features in connection with the statistical information gathered together for the benefit of the reader. We can point to an increase of ten million tons in the coal production of the United States, over and above the tonnage reported in our last review, and from all the signs of the times the present year will show an increase beyond the sum total now recorded, of sixty million tons of coal. But one other country in the world, and that our Anglo-Saxon mother country, surpasses this tonnage. We have doubled the output of the year 1869—what may we not expect in another decade? Truly the Western Empire is to be congratulated upon the signs of prosperity. It will be noticed that the States of the West are using immense quantities of coal of all kinds, while the nearer regions to the seaboard make Giant strides. The European countries show increased tonnage and the world's consumption of coal and iron is yearly increasing. Coal emancipates iron from its crudeness and furnishes it with power as an instrument of commerce. The union of the two minerals has solved the question of production, and rendered easy the distribution of all other commodities. Coal is a master power, and Iron an agent of Industry.

The yearly editions of this work contain information that should be known to all who traffic in or consume coal. One year's edition differs from another, in that each is entirely new, and therefore the preceding editions should be consulted. We return our thanks for the many courtesies extended by parties who have contributed statistics to make the work so complete, and trust others who may have facts and figures to communicate will make themselves known. In the comparative business that is done by countries, states, districts or individuals, there is much to interest the reader.

## ANTHRACITE COAL.

Anthracite coal is found in an area of about 472 square miles, in Luzerne, Carbon, Schuylkill, Northumberland, Dauphin, and Columbia counties, in the State of Pennsylvania.

There are three great divisions—which are named from their locations—the first or Southern, the second or Middle, and the third or Northern coal fields.

The Southern coal field lies principally in Schuylkill county, and hence it is often called the Schuylkill region. The area is said to be 146 square miles.

The Mahanoy, Shamokin (often included in the Schuylkill) and Lehigh regions constitute the Middle coal field. Area is stated at 128 square miles.

The Northern coal field is in Luzerne county, and embraces what is known as the Wyoming, Lackawanna, Scranton, and Wilkesbarre regions, with a total area of 198 square miles.

Anthracite coal is found in other States and countries, but the quality is not regarded as equal to that of the Pennsylvania coals, by the best authorities, and the commercial success of these outside deposits has yet to be demonstrated.

The business of the year was unprofitable, notwithstanding the immense production; in fact, the losses were due to the fact that the supply was always ahead of the demand. It is anticipated that during the current year the improved condition of the manufacturing industries of the country will reverse this position, and by increasing the demand for coal, make the business profitable to all concerned.

We referred in our last edition, to the great waste in the mining and marketing of Anthracite coal. It is well known that the amount marketed represents but a percentage of the quantity mined or extracted, and we have the authority of Prof. P. W. Sheaffer for the statement that if twenty million tons are annually marketed the amount wasted to produce this quantity is thirty million tons. These figures are alarming and point to the truth of our statement of a year ago, that "Anthracite will soon be considered a luxury, and that dependence as a source of steam supply must be found in Bituminous coals." This percentage of waste is considered much too large, by conservative men in the trade, but even their average percentum is something like fifteen millions as the amount wasted. In other words, we market but little over one-half of the presumed average contents of the coal seams.

In the schedules which follow, all the necessary details of production, distribution, price, etc., will be found presented in the most concise form, and the business done by each particular interest may be understood at a glance. We repeat the statement of a year ago, that less than 50 per cent. of the total output recorded, comes through to tide-water for shipment, and consumption; in fact, the closest calculations show about forty per cent. The remaining sixty per cent. is distributed for consumption to manufacturing companies and other consumers, along the several lines of railroad, and to points outside of the State of Pennsylvania. The business done in this variety of fuel at the West, was larger during 1879 than for any preceding year, and the area of consumption must largely increase in this direction as population and wealth increase. The shipments of Anthracite foreign show a gratifying increase. On page 44 may be found details of the business for the year 1879.

# THE COAL TRADE.

2

## LEHIGH VALLEY RAILROAD CO.

Statement of the total coal tonnage, together with the tonnage east of Mauch Chunk, from year 1855 to date:—

Year.	East of Mauch Chunk.	Total coal tonnage.	Year.	East of Mauch Chunk.	Total coal tonnage.
1855 (3 mo.).....	8,482	8,482	1868.....	2,225,630	2,603,102
1856.....	165,740	165,740	1869.....	2,015,206	2,310,170
1857.....	418,235	418,235	1870.....	2,810,020	3,603,586
1858.....	471,029	471,029	1871.....	2,210,272	2,889,074
1859.....	577,651	577,651	1872.....	3,009,395	3,850,118
1860.....	730,641	730,641	1873.....	3,189,023	4,144,339
1861.....	743,671	743,671	1874.....	3,016,636	4,150,659
1862.....	882,573	882,573	1875.....	2,417,800	3,277,571
1863.....	1,195,154	1,195,154	1876.....	3,129,895	3,951,513
1864.....	1,295,419	1,466,794	1877.....	3,453,533	4,362,124
1865.....	1,402,276	1,687,462	1878.....	2,758,756	3,446,615
1866.....	1,730,474	2,037,714	1879.....	3,53,824	4,361,785
1867.....	1,948,385	2,030,156			

The sources of this company's business are as follows:—

FROM	TONS—1879.	TONS—1878.	TONS—1877.
Wyoming region.....	1,135,587	919,712	1,931,777
Hazleton region.....	1,964,278	1,520,049	2,121,358
Upper Lehigh region.....	93	943	699
Beaver Meadow region.....	474,761	435,951	577,452
Mauch Chunk region.....	982	4,123	6,099
Mahanoy region.....	786,032	565,825	624,738
Total, in tons of 2,240 lbs.....	4,361,785	3,446,615	4,362,124

The year ends with November 30.

## CENTRAL RAILROAD OF NEW JERSEY.

Amount of coal carried over the Lehigh & Susquehanna Railroad since its opening:—

YEAR.	TONS.	YEAR.	TONS.
1868.....	1,058,054	1874.....	2,972,286
1869.....	1,297,825	1875.....	2,661,635
1870.....	1,354,052	1876.....	2,952,520
1871.....	1,033,587	1877.....	2,969,788
1872.....	2,527,068	1878.....	2,390,655
1873.....	3,089,697	1879.....	4,088,954

The distribution was as follows, in tons of 2,240 lbs.

	1878.	1879.
Forwarded east by rail to tidal points.....	1,371,952	2,533,403
Forwarded east by rail to local points.....	502,843	832,097
Forwarded east by rail for use of company.....	102,247	144,503
Delivered at and above Mauch Chunk.....	59,130	99,140
Delivered to Coalport and Hazard for canal.....	301,217	387,039
Delivered to Lehigh Valley Railroad.....	53,265	92,772



## THE DELAWARE, LACKAWANNA AND WESTERN R. R. CO.

YEAR.	TONS.	YEAR.	TONS.	YEAR.	TONS.
1854.....	133,965	1863.....	1,223,165	1872.....	2,836,948
1855.....	187,000	1864.....	1,302,457	1873.....	3,136,306
1856.....	305,530	1865.....	1,007,074	1874.....	2,570,437
1857.....	490,023	1866.....	1,519,538	1875.....	3,326,901
1858.....	633,411	1867.....	1,719,321	1876.....	2,300,500
1859.....	829,435	1868.....	1,728,785	1877.....	2,320,636
1860.....	1,080,227	1869.....	1,563,928	1878.....	2,439,111
1861.....	1,104,319	1870.....	2,348,097	1879.....	4,284,285
1862.....	1,094,315	1871.....	1,916,486		

Tons are stated at 2,000 lbs.

## PENNSYLVANIA COAL COMPANY.

YEAR.	TONS.	YEAR.	TONS.	YEAR.	TONS.
1850.....	111,014	1860.....	701,523	1870.....	1,086,008
1851.....	316,017	1861.....	629,657	1871.....	802,039
1852.....	426,164	1862.....	601,091	1872.....	1,213,478
1853.....	512,659	1863.....	662,904	1873.....	1,239,214
1854.....	496,648	1864.....	759,544	1874.....	1,338,663
1855.....	504,803	1865.....	577,494	1875.....	1,368,207
1856.....	612,500	1866.....	535,385	1876.....	1,086,475
1857.....	536,008	1867.....	861,730	1877.....	1,064,583
1858.....	630,056	1868.....	953,855	1878.....	926,170
1859.....	688,854	1869.....	966,637	1879.....	1,372,759

Tons are stated at 2,240 lbs.

## DELAWARE AND HUDSON CANAL COMPANY.

This company began mining and carrying coal in 1829.

YEAR.	TONS.	YEAR.	TONS.
1829.....	7,000	1873.....	2,752,595
1830 to 1839.....	846,330	1874.....	2,399,417
1840 to 1849.....	2,897,881	1875.....	3,053,817
1850 to 1859.....	4,838,855	1876.....	1,997,545
1860 to 1869.....	10,098,661	1877.....	1,929,248
1870.....	2,039,722	1878.....	2,144,120
1871.....	1,366,474	1879.....	3,053,618
1872.....	2,930,761		

Tons are stated at 2,240 lbs.

## LEHIGH AND WILKES-BARRE COAL COMPANY.

1874.....	2,479,382 tons.	1877.....	2,196,864 tons.
1875.....	2,085,038 tons.	1878.....	1,201,406 tons.
1876.....	2,300,555 tons.	1879.....	2,189,551 tons.

Since 1877, the coal from Summit Hill is not included.

## PHILADELPHIA AND READING RAILROAD COMPANY.

YEAR.	TONS.	YEAR.	TONS.	YEAR.	TONS.
1850	1,351,502	1860	1,946,195	1870	4,633,504
1851	1,650,270	1861	1,639,535	1871	6,002,573
1852	1,650,912	1862	2,310,990	1872	6,185,434
1853	1,582,243	1863	3,035,261	1873	6,546,555
1854	1,987,854	1864	3,065,577	1874	6,348,812
1855	2,213,292	1865	3,090,814	1875	5,505,455
1856	2,088,903	1866	3,714,684	1876	5,595,207
1857	1,709,692	1867	3,446,826	1877	7,255,818
1858	1,542,646	1868	4,574,874	1878	5,909,140
1859	1,632,932	1869	4,239,457	1879	8,147,579

Year ends November 30th. Tons and 2,240 lbs.

The coal carried over main line and branches was distributed as follows:

Year.	Line.	Philadelphia.	Port Richmond.
1863	548,755 tons.	388,352 tons.	2,128,154 tons.
1864	634,074 tons.	373,070 tons.	2,058,423 tons.
1865	659,376 tons.	380,283 tons.	2,051,202 tons.
1866	836,598 tons.	475,189 tons.	2,402,897 tons.
1867	935,694 tons.	386,933 tons.	2,121,189 tons.
1868	597,903 tons.	697,277 tons.	2,113,581 tons.
1869	923,504 tons.	888,633 tons.	2,362,972 tons.
1870	1,074,400 tons.	785,535 tons.	1,893,055 tons.
1871	1,128,227 tons.	923,539 tons.	2,311,393 tons.
1872	1,357,203 tons.	998,212 tons.	2,223,137 tons.
1873	1,670,188 tons.	1,075,255 tons.	2,266,892 tons.
1874	1,715,052 tons.	1,064,304 tons.	2,076,259 tons.
1875	1,197,449 tons.	923,850 tons.	1,713,978 tons.
1876	1,444,780 tons.	914,881 tons.	1,770,523 tons.
1877	1,429,510 tons.	1,022,726 tons.	2,825,101 tons.
1878	1,446,764 tons.	958,040 tons.	2,086,115 tons.
1879*	1,778,963 tons.	1,158,659 tons.	2,547,817 tons.

Details of the company's business for the fiscal year ending November 30, 1879.

	Paying Freight.	For Company's Use.
Received at Port Carbon	1,991,059 tons.	201,927 tons.
Received at Mount Carbon	130,472 tons.	22,666 tons.
Received at Schuylkill Haven	1,587,747 tons.	129,282 tons.
Received at Pine Grove	672,751 tons.	6,397 tons.
Received at Tamaqua	633,373 tons.	66,765 tons.
Wyoming and Lehigh coal	695,155 tons.	2,377 tons.
Bituminous coal	235,711 tons.	4,064 tons.
Carried by canal	917,351 tons.	.....
Shipped Westward, via Catawissa, etc.	584,590 tons.	27,029 tons.
Consumed on Laterals	110,621 tons.	.....
Shipped East, via Lehigh Valley R. R.	128,239 tons.	.....

Total tonnage for the year.....7,687,069 tons. 460,510 tons.

\*In addition, *through to tide*, 30,034 tons to Elizabethport, 103,395 tons to South Amboy, and 82,686 tons to Port Johnston.

## BUSINESS OF THE ANTHRACITE COMPANIES.

From statistics prepared by J. H. Jones, we take the following statement :

	Five years 1868-72.		Five years 1873-77.	
	TONS.	PER CENT.	TONS.	PER CENT.
Philadelphia and Reading Railroad Co.....	24,207,937	30.55	27,993,619	27.84
Lehigh Valley Railroad Co.....	15,261,052	19.26	20,151,995	20.04
Central Railroad of New Jersey.....	8,444,923	10.67	13,485,624	13.41
Delaware, Lack. and Western Railroad Co....	9,284,638	11.72	12,326,239	12.26
Delaware and Hudson Canal Co.....	10,878,434	13.72	12,121,992	12.03
Pennsylvania Railroad Co.....	5,874,230	7.42	8,038,833	8.04
Pennsylvania Coal Co.....	5,276,927	6.66	6,382,240	6.35
	<hr/>	<hr/>	<hr/>	<hr/>
	79,228,146	100.00	100,550,542	100.00
	<hr/>	<hr/>	<hr/>	<hr/>
	Tons 1877.		Tons 1878.	Tons 1879.
Philadelphia and Reading Railroad Co.....	6,842,105		5,112,218	7,442,617
Lehigh Valley Railroad Co.....	4,511,331		3,493,318	4,405,957
Central Railroad of New Jersey.....	2,837,500		2,264,979	3,825,553
Delaware, Lackawanna and Western Railroad Co....	2,089,523		2,180,672	3,867,407
Delaware and Hudson Canal Co.....	1,918,617		2,046,234	3,014,117
Pennsylvania Railroad Co.....	1,530,594		1,362,673	1,682,106
Pennsylvania Coal Co.....	1,118,011		957,022	1,427,150
Erie Interest.....			278,132	477,782
	<hr/>		<hr/>	<hr/>
	20,847,681		17,605,261	26,142,680

## LEHIGH COAL AND NAVIGATION CO.

YEAR.	TONS.	YEAR.	TONS.
1872.....	566,724	1876.....	606,773
1873.....	525,623	1877.....	550,519
1874.....	572,470	1878.....	430,987
1875.....	397,427	1879.....	701,761

This company dates back to 1820, as a mining and carrying company. The figures in the schedule above, are the figures of the production at the 'Summit mines.'

## SULLIVAN (ANTHRACITE) COAL PRODUCT.

This coal comes from Sullivan county, Pa., and is shipped over the State Line and Sullivan road to the P. & N. Y. R. R. The business is not included in the statistics above given :—

1871.....	24,665 tons.	1876.....	30,000 tons.
1872.....	54,966 tons.	1877.....	23,000 tons.
1873.....	35,267 tons.	1878.....	37,000 tons.
1874.....	33,896 tons.	1879.....	50,000 tons.
1875.....	16,522 tons.		

# THE PRODUCTION OF ANTHRACITE COAL.

The shipment of Anthracite has been as stated below, by the several regions, since the beginning of the Industry. It should be stated that the amount of coal used at the mines and sold to employees, is not included in these returns; this is something like seven or eight per cent. additional.

YEAR.	SCHUYLKILL.	LEHIGH.	WYOMING.	TOTAL.	YEAR.	SCHUYLKILL.	LEHIGH.	WYOMING.	TOTAL.
1820.....	—	365	—	365	1850.....	1,840,690	690,455	827,823	3,358,899
1821.....	—	1,073	—	1,073	1851.....	2,328,525	904,224	1,156,167	4,448,916
1822.....	1,480	2,240	—	3,720	1852.....	2,636,835	1,072,136	1,244,500	4,993,471
1823.....	1,128	5,823	—	6,951	1853.....	2,565,110	1,054,309	1,475,732	5,195,151
1824.....	1,567	9,541	—	11,108	1854.....	3,191,670	1,207,136	1,603,478	6,002,334
1825.....	6,500	28,393	—	34,893	1855.....	3,552,943	1,284,113	1,771,511	6,608,567
1826.....	15,767	31,280	—	47,047	1856.....	3,902,999	1,351,970	1,972,581	6,927,550
1827.....	31,360	32,074	—	63,434	1857.....	3,373,797	1,318,541	1,952,693	6,644,941
1828.....	47,284	30,232	—	77,516	1858.....	3,273,245	1,380,060	2,186,094	6,839,369
1829.....	79,973	25,110	7,000	112,083	1859.....	3,448,708	1,628,311	2,731,235	7,808,255
1830.....	89,984	41,759	43,000	174,734	1860.....	3,749,632	1,821,674	2,941,817	8,513,123
1831.....	81,854	40,966	54,000	176,820	1861.....	3,160,747	1,738,377	3,055,140	7,954,274
1832.....	209,271	70,000	84,000	363,271	1862.....	3,372,583	1,351,054	3,145,770	7,869,407
1833.....	253,971	123,001	111,777	487,749	1863.....	3,911,683	1,894,713	3,759,610	9,566,005
1834.....	226,692	106,244	43,700	376,636	1864.....	4,161,970	2,054,669	3,900,835	10,177,475
1835.....	339,503	131,250	90,000	560,753	1865.....	4,356,959	2,040,913	3,254,519	9,652,391
1836.....	439,045	148,211	103,861	684,117	1866.....	5,787,902	2,179,364	4,736,616	12,703,882
1837.....	530,152	232,902	115,387	868,441	1867.....	5,161,671	2,502,054	5,325,000	12,988,725
1838.....	440,875	213,615	78,207	738,697	1868.....	5,380,737	2,502,582	5,968,143	13,801,455
1839.....	475,077	221,025	122,300	818,402	1869.....	5,775,138	1,949,673	6,141,369	13,866,180
1840.....	490,596	225,313	148,470	864,379	1870.....	4,968,157	3,239,374	7,974,660	16,182,191
1841.....	624,466	143,097	192,270	969,773	1871.....	6,552,772	2,235,707	6,911,242	15,699,721
1842.....	683,273	272,540	252,599	1,108,412	1872.....	6,694,890	3,873,339	9,101,549	19,669,778
1843.....	710,200	267,703	285,605	1,263,508	1873.....	7,212,601	3,705,596	10,300,755	21,219,952
1844.....	887,937	277,002	305,911	1,470,850	1874.....	6,866,877	2,773,836	9,504,403	20,145,121
1845.....	1,131,724	429,453	451,836	2,013,013	1875.....	6,281,712	3,854,005	10,596,155	19,712,472
1846.....	1,308,500	517,116	518,339	2,344,005	1876.....	6,221,934	3,864,919	8,424,158	18,510,011
1847.....	1,655,735	633,067	683,067	2,982,309	1877.....	8,195,042	4,382,760	8,900,377	20,828,179
1848.....	1,738,721	670,321	685,196	3,094,238	1878.....	6,282,226	3,237,449	8,056,537	17,605,262
1849.....	1,728,500	781,556	732,910	3,242,966	1879.....	8,900,329	4,595,567	12,586,293	26,142,689



## PHILADELPHIA AND READING COAL AND IRON CO.

The coal produced from the lands owned by the company during the years 1873-79, is shown below, together with the reported average cost of coal in cars at the mines, of the Philadelphia and Reading Coal and Iron Company.

	Leases produced.	P. & R. C. & I. Co. produced.	Average cost at mines.
1873.....	2,055,565 tons.	1,348,838 tons.	\$2.51 per ton.
1874.....	1,862,370 tons.	1,374,790 tons.	2.45 per ton.
1875.....	1,594,741 tons.	1,510,572 tons.	1.87 per ton.
1876.....	1,218,533 tons.	1,853,364 tons.	1.35 per ton.
1877.....	1,389,108 tons.	3,794,528 tons.	1.04 per ton.
1878.....	1,100,181 tons.	2,727,608 tons.	1.24 per ton.
1879.....	1,300,322 tons.	4,269,929 tons.	1.14 per ton.

The ton named is that of 2,240 lbs. The figures for 1876 are for eleven months only.

## PENNSYLVANIA AND NEW YORK R. R.

This line is an important feeder to the Lehigh Valley Railroad, for its business to the north and west. In addition thereto, it transports a large amount of Bituminous coal from what is known as the "Barclay" region. A comparison of tonnage for fiscal year ending November 30th last is appended.

Anthracite.....	In 1878—780,796 tons.	In 1879—860,161 tons.
Bituminous.....	In 1878—314,567 tons.	In 1879—329,901 tons.

## PENNSYLVANIA R. R.—BELVIDERE DIVISION.

This line forms an important feeder to the Anthracite roads centering at Phillipsburg, N. J. The sources of supply and distribution are clearly given below:—

From Lehigh region.....	In 1878—573,757 tons.	In 1879—719,415 tons.
From Wyoming region.....	In 1878—155,034 tons.	In 1879—260,451 tons.
	Tons, 1878.	Tons, 1879.
Distributed to Trenton for shipment.....	14,233	35,902
Distributed to South Amboy for shipment.....	430,811	502,367
Distribution to local points for consumption.....	199,666	344,828
Coal for company's use.....	84,822	96,770

## MINERAL R. R. &amp; MINING CO.

The production of Anthracite coal at the mines of this company during the year 1879, is given below; these collieries are in the Shamokin region, and the Pennsylvania Railroad Co., are the land owners.

Cameron, 160,228 tons; Luke Fidler, 114,124 tons; Pennsylvania, 16,960 tons.

## SUMMIT BRANCH R. R. CO.

The production of Anthracite coal at the mines of this company in 1879 was 246,280 tons from the Summit Branch colliery, and 165,186 tons from the Short Mountain colliery. The Pennsylvania Railroad Co., control this company.

## ANTHRACITE OUTPUT—PERCENTAGE OF REGIONS.

The aggregate amount of Anthracite *marketed* foots up 386,707,723 tons from 1820 to 1879 inclusive. Mr. J. H. Jones kindly furnishes us with a statement, giving the yearly tonnage of each region, and the percentage each year of each region. We take the sum total at the beginning of the year 1871, as 207,110,920 tons, and add the following details since that date:

Year.	Schuykill.	P. C.	Lehigh.	P. C.	Wyoming.	P. C.	Total.
1871	6,552,772	41.74	2,235,707	14.24	6,911,242	44.02	15,699,721
1872	6,694,890	34.03	3,873,339	19.70	9,101,549	46.27	19,669,778
1873	7,212,601	33.97	3,705,596	17.46	10,309,755	48.57	21,227,922
1874	6,866,877	34.09	3,773,836	18.73	9,504,408	47.18	20,145,121
1875	6,281,712	31.87	2,834,005	14.38	10,596,155	53.75	19,712,472
1876	6,221,934	33.63	3,854,919	20.84	8,424,158	45.53	18,501,411
1877	8,195,042	39.35	4,392,760	20.80	8,300,377	39.85	20,828,179
1878	6,282,226	35.68	3,237,449	18.40	8,035,587	45.92	17,605,262
1879	8,960,329	34.28	4,595,567	17.58	12,586,293	48.14	26,142,689

## ANTHRACITE COAL ON HAND AT TIDE-WATER.

1878.	Tons.	1879.	Tons.
January 1.....	685,186	January 31.....	498,982
February 2.....	715,612	February 28.....	590,421
March 2.....	645,938	March 31.....	630,614
March 30.....	536,464	April 30.....	638,486
April 27.....	511,819	May 31.....	512,605
June 1.....	442,881	June 30.....	432,167
June 29.....	493,523	July 31.....	503,791
July 27.....	552,376	August 31.....	701,740
August 31.....	710,688	September 30.....	684,897
September 28.....	546,583	October 31.....	534,000
November 2.....	435,631	November 30.....	508,990
November 30.....	446,068	December 31.....	613,512
December 31.....	504,377		

## ERIE RAILWAY—ANTHRACITE TONNAGE.

The tonnage reported below represents the production of mines in which the N. Y., Lake Erie and Western Railway, is interested.

Year.	Tons.	Year.	Tons.
1871.....	55,596	1876.....	230,709
1872.....	83,288	1877.....	175,095
1873.....	36,728	1878.....	278,132
1874.....	197,562	1879.....	477,782
1875.....	303,039		

## THE READING STEAM COLLIERS.

The following table shows the voyages made, tons carried, and miles run by the Philadelphia and Reading Railroad Company's steam colliers for the year 1879:—

NAME.	VOYAGES.	TONS.	MILES.
Rattlesnake.....	35	17,042	33,635
Centipede.....	43	22,251	41,817
Achilles.....	40	40,415	38,798
Hercules.....	58	38,816	37,247
Panther.....	43	35,519	36,178
Reading.....	34	55,935	36,473
Harrisburg.....	39	64,216	36,589
Lancaster.....	38	62,823	35,028
Perkiomen.....	41	49,751	38,863
Berks.....	33	22,881	37,302
Williamsport.....	39	63,897	38,437
Allentown.....	41	67,749	37,980
Lottsville.....	41	68,978	37,427
Totals.....	510	610,275	486,174

The total tons carried by the entire fleet of the company, since these vessels were first run, amount to 3,290,283 tons. The average rate of freight per ton, in 1879, was \$1.07½.

## STATISTICS OF LEHIGH COAL PRODUCTION.

The following is a summary of the coal tonnage produced, number of tons marketed, and the amount of coal consumed for home purposes in the Lehigh region, during the year 1879, in tons of 2,240 lbs., furnished by T. D. Jones, Mine Inspector:—

	PRODUCTION.	SHIPMENTS TO MARKET.
Mammoth seam.....	1,977,129	1,830,675
Wharton seam.....	717,149	738,110
Buck Mountain seam.....	1,382,198	1,279,813
Totals.....	4,156,486	3,848,598

The amount sold at mines to employees, or used by engines raising and preparing coal, is some eight per cent., or on the total, 307,888 tons.

The shipments of the region during 1879, show an increase of 1,111,017 tons or almost forty per cent. Neither of the other regions can make as favorable a showing of their trade for the past year, and the progressive steps which the local operators generally are taking indicate an even more gratifying outcome for the current year's business.

## SCHUYLKILL CANAL COAL TRADE.—1879.

Carried through to Philadelphia.....	315,802 tons.
Passed through Delaware and Raritan Canal.....	486,653 tons.
Delivered to local points.....	108,282 tons.
Passed through to Chesapeake and Delaware Canal.....	179 tons.

## MINERS' WAGES IN THE LEHIGH REGION.

The basis is the average price of coal at tide-water in New York harbor, and on this basis, as the price rises or falls, wages are paid. At \$5.00 per ton as the average for coal, the price per car is 87 cents; miners' wages per week, \$12.60; and laborers' wages \$10.80 for first-class, and \$9.90 for second-class miners' laborers. Driving gangways \$6.12 per yard, for timbered, and \$5.35 not timbered. Driving Chutes \$2.87 per yard; Cross Cuts \$1.91 per yard. Cross holes from gangway to airway \$3.85 per yard. Airway, 25 square feet, per yard \$3.25. Outside labor, first-class \$9.60 per week, second-class \$9.00, third-class \$8.00. On contract, on Mammoth vein coal, per ton of 48 cubic feet, 42½ cents.

PRICE OF COAL.	PER CENT. BELOW BASIS.	CAR PRICES.	MINERS' WAGES.	LABORERS' WAGES.
\$5 00	0	87.1	\$12 60	\$10 80
4 90	1	86.2	12 47	10 69
4 80	2	85.3	12 35	10 58
4 70	3	84.5	12 22	10 47
4 60	4	83.6	12 10	10 36
4 50	5	82.7	11 97	10 26
4 40	6	81.9	11 84	10 15
4 30	7	81.0	11 72	10 04
4 20	8	80.1	11 59	9 93
4 10	9	79.2	11 46	9 82
4 00	10	78.3	11 34	9 72
3 90	11	77.5	11 21	9 61
3 80	12	76.6	11 09	9 50
3 70	13	75.7	10 96	9 39
3 60	14	74.9	10 83	9 29
3 50	15	74.0	10 71	9 18
3 40	16	73.1	10 58	9 07
3 30	17	72.3	10 45	8 96
3 20	18	71.4	10 33	8 85
3 10	19	70.5	10 20	8 74
3 00	20	69.6	10 08	8 64

## WAGES IN THE SCHUYLKILL REGION.

Wages in this region are based upon the average price of coal at Schuylkill Haven, obtained monthly. The basis is \$2.50, and wages rise or fall as the price of coal is above or below this rate at the point named. During 1879, the average price was \$1.75½ per ton, and wages paid for the year were at an average of 24½ per cent. below the basis price. The Reading company paid on the rate of tolls received for carrying coal, so that the average rate of wages paid by them was at 15½ per cent. below the basis.

At \$2.50 miners by the week make from \$11.70 to \$15.00 per week.

At \$2.50 outside men are paid \$9.00 to \$10.00 per week.

## WAGES IN THE WYOMING REGION.

Miners are paid 80 cents per car for cutting coal when coal is \$3.00 per ton at tide-water. Inside men \$1.59 per day for the highest price, some are rated at less, according to ability. Outside men, \$1.25 per day. The miner pays a laborer out of his rate per car, and finds powder, oil and other supplies. Rates advance ten per cent. for every dollar per ton advance in the price of coal.



## PERCENTAGES OF VARIOUS SIZES OF ANTHRACITE COAL.

This important question, is continually coming up, and we find pleasure in presenting the following facts gathered by Mr. T. D. JONES, Mine Inspector for the Hazleton district, for the year 1877. As he remarks the percentages vary according to the demand for the various sizes. "During the greater part of 1877 the demand for lump coal was very slack, hence the deterioration by breakage, due to the demand for smaller sizes, was very great. I have known the Wharton seam to produce seventy-five per cent. of lump, but not without a sacrifice of the small sizes, and an inferior quality of lump was the result. The Wharton seam will average fifty per cent. of lump coal without closing the grate bars closer than four inches. The maximum yield of the Mammoth seam is about forty-five per cent. of lump, and that of the Buck Mountain about forty per cent. The buckwheat coal and a great deal of "chips" is consumed at the mines, for steam purposes. The "chips" is a thin coal mixed with thin slate, which is not marketable, is obtained by a circular segment, consisting of slots instead of meshes, and is put on the screen next to the chestnut coal jackets. In being prepared for market, the different sizes of coal are separated by a revolving screen, which is about five feet in diameter, and varies in length from twenty-two to thirty feet, making about eight revolutions a minute. The meshes of the screen segments or jackets increase in diameter, from one-half to two and a half inches, on the large screens. The chestnut and pea coals are generally made by the counter screen. The following are the sizes of the meshes adapted for the various kinds of coal:

Buckwheat coal passes over one-eighth inch mesh, and falls through three-eighth inch mesh.

Pea coal passes over three-eighth inch mesh, and falls through five-eighth inch mesh.

Chestnut coal passes over five-eighth inch mesh, and falls through one and one-eighth inch mesh.

Stove coal passes over one and one-eighth inch mesh, and falls through one and three-eighth inch mesh.

Egg coal passes over one and three-eighth inch mesh, and falls through two and one-half inch mesh.

Broken coal passes over two and one-half inch mesh, and falls through three and three-eighth inch mesh.

Steamboat coal falls through four and three-fourth inch space.

Collieries.	Lump.	Steam-boat.	Broken.	Egg.	Stove.	Chest-nut.	Pea.	Buck-wheat.	Name of Seam.
Coleraine.....	34.8	....	7.9	17.6	17.8	12.9	9.	....	Mammoth and Wharton
Harleigh.....	11.2	....	12.7	16.2	30	26.5	3.4	....	Mammoth
Milnesville.....	20.8	....	18.7	18	15.6	18.2	8.7	....	Mammoth.
Buck Mountain.....	20.2	....	20.4	15.9	16.3	15.1	12.1	....	Buck Mountain.
Beaver Brook.....	37.3	16.3	15.7	9.5	8.7	8.6	3.9	....	Wharton.
Upper Lehigh.....	11.6	6	18.2	16.4	19.4	15	11.4	2	Buck Mountain.
East Sugar Loaf.....	21.5	....	17.2	17.3	20.6	18.2	5.2	....	Mammoth.
Gowen.....	4	....	7.5	16	35	25	12.5	....	Buck Mountain.
Lansford.....	13.5	....	19.9	9.7	16.3	23.8	13.5	3.3	Mammoth.
Ebervale.....	22	7.2	17.4	16.7	15.2	14.3	7.2	....	Mammoth.
Spring Brook.....	34.7	....	7.4	13.2	23.9	15	5.8	....	Mammoth and Wharton.
Jeddo.....	36.6	.7	12	16.8	13.	12.7	8.2	....	Mammoth.
Highland.....	38.6	.9	15.5	15.7	9	11.4	8.9	....	Buck Mountain.
Council Ridge.....	14.3	5.5	15.9	16.2	18.2	17.3	12.1	....	Buck Mountain.
Cross Creek.....	24.6	7.6	18.6	17.3	11.7	11	9.2	....	Buck Mountain.
Hazleton.....	33.7	....	13.6	12.6	14.4	15.9	4.8	....	Mammoth.
Lattimer.....	21.2	....	10.3	19.1	22	20.1	6.8	....	Mammoth.
Hollywood.....	22.4	....	20.1	18.6	16.8	19.1	5	....	Mammoth.
Mount Pleasant.....	39.3	....	5.4	13.3	22.5	16.5	3	....	Wharton.
Averages.....	24.6	2.3	14.5	15.5	19.2	16.7	7.9	.3	

## COAL TRADE OF THE NEW YORK CANALS.

The shipments were larger than during the season of 1878, but not so great as during 1877. The railroads are taking away the trade of the canal, as they make low rates for all through business, in return box cars. The quantity carried on the State canals, in both directions, East and West, is stated by the Canal Auditor, to be as below :—

QUALITY—TONS, 2,000 LBS.	1877.	1878.	1879.
Anthracite.....	1,015,259	681,400	810,517
Bituminous.....	257,642	207,319	160,533

## SHIPMENTS FROM SHAMOKIN REGION.

YEAR.	TONS.	YEAR.	TONS.	YEAR.	TONS.
1839.....	11,930	1853.....	15,300	1867.....	533,815
1840.....	15,505	1854.....	63,500	1868.....	911,784
1841.....	21,463	1855.....	116,117	1869.....	974,015
1842.....	10,000	1856.....	210,518	1870.....	1,025,515
1843.....	10,000	1857.....	266,517	1871.....	1,213,096
1844.....	13,037	1858.....	242,579	1872.....	1,221,326
1845.....	10,000	1859.....	305,043	1873.....	1,234,063
1846.....	12,572	1860.....	300,256	1874.....	1,221,550
1847.....	14,904	1861.....	290,923	1875.....	1,628,683
1848.....	19,356	1862.....	304,865	1876.....	1,391,752
1849.....	19,650	1863.....	337,136	1877.....	1,776,163
1850.....	19,921	1864.....	339,779	1878.....	1,452,254
1851.....	24,899	1865.....	484,257	1879.....	1,829,645
1852.....	25,846	1866.....	610,800	Total.....	20,688,098

## YEARLY PRICES OF COAL.

We give below prices for Schuylkill White Ash Lump coal, on board vessels at Philadelphia, from 1834 to 1879, being the average rates obtained during the year:—

Years.	Prices.	Years.	Prices.	Years.	Prices.	Years.	Prices.
1834.....	\$4 84	1846.....	\$3 90	1857.....	\$3 87	1868.....	\$3 86
1835.....	4 84	1847.....	3 80	1858.....	3 43	1869.....	5 31
1836.....	6 64	1848.....	3 50	1859.....	3 25	1870.....	4 39
1837.....	6 72	1849.....	3 62	1860.....	3 40	1871.....	4 46
1838.....	5 27	1850.....	3 64	1861.....	3 39	1872.....	3 74
1839.....	5 00	1851.....	3 34	1862.....	4 14	1873.....	4 27
1840.....	4 91	1852.....	3 46	1863.....	6 06	1874.....	4 55
1841.....	5 79	1853.....	3 70	1864.....	†8 39	1875.....	4 39
1842.....	4 18	1854.....	5 19	1865.....	7 86	1876.....	3 87
1843.....	3 27	1855.....	4 49	1866.....	5 80	1877.....	2 59
1844.....	3 20	1856.....	4 11	1867.....	4 37	1878.....	3 25
1845.....	3 46					1879.....	*2 25

\*Lowest average for year. †Highest average for year.

## THE PRODUCTION OF ANTHRACITE, LIVES LOST, &amp;c.

The report of the Inspectors of Mines, for 1878, give the following statistics :—

	I.	II.	III.	IV.	V.	VI.
Tons mined, in year.....	2,956,588	4,032,372	4,943,410	3,049,275	3,070,218	1,229,081
Lives lost.....	30	33	34	26	47	14
Tons produced per life lost.....	98,553	113,399	145,394	117,276	65,323	87,791

I—South District of Luzerne and Carbon Counties. II—Middle District, Luzerne County. III—Eastern District, Luzerne County. IV—Second or Shenandoah District. V—Third or Shamokin District. VI—First or Pottsville District.

## PENNSYLVANIA COAL CO'S PRICE-LISTS—1879.

	LUMP.	GRATE.	EGG.	STOVE.	CHESTNUT.
January 1.....	\$....	\$2 60	\$2 00	\$3 05	\$2 60
January 20.....		2 50	2 50	2 85	2 60
January 29.....		2 40	2 40	2 80	2 60
February 27.....		2 30	2 30	2 65	2 35
March 31.....	2 35	2 35	2 35	2 70	2 45
April 10.....	2 20	2 20	2 20	2 50	2 40
April 19.....	2 15	2 15	2 20	2 40	2 40
April 30.....	2 15	2 15	2 20	2 35	2 35
June 1.....	2 15	2 15	2 20	2 35	2 35
June 10.....	2 25	2 25	2 30	2 45	2 45
July 1.....	2 25	2 25	2 30	2 55	2 40
August 1.....	2 25	2 25	2 30	2 55	2 50
August 13.....	2 20	2 20	2 25	2 50	2 35
September 1.....	2 20	2 20	2 25	2 50	2 35
October 1.....	2 20	2 20	2 25	2 50	2 35
October 10.....	2 40	2 40	2 40	2 60	2 50
October 20.....	2 60	2 60	2 60	2 60	2 70
November 1.....	3 20	3 10	3 20	3 40	3 40
December 1.....	3 20	3 10	3 10	3 50	3 50

July 21. Chestnut was advanced ten cents per ton. November 10th, Egg was reduced ten cents per ton. During September, October, and November, there was no outside circular, therefore prices are nominal. January, February and March quotations, at Weehawken; the remainder at Newburgh.

## PRICE-LISTS OF LEHIGH COAL—1879.

Taking the Honey Brook coal of the Lehigh and Wilkes-Barre Coal Co., f. o. b. at Port Johnston, for the standard quotation.

	LUMP.	GRATE.	EGG.	STOVE.	CHESTNUT.
January.....	\$3 25	\$3 00	\$3 00	\$3 20	\$2 60
February.....	3 00	2 85	2 85	2 90	2 60
March.....	3 00	2 80	2 80	2 80	2 60
April 1.....	3 00	2 70	2 70	2 70	2 50
April 10.....	3 00	2 60	2 60	2 60	2 40
May.....	3 00	2 60	2 60	2 60	2 40
June.....	3 25	2 80	2 80	2 80	2 65
July.....	3 25	2 80	2 80	2 90	2 65
August 1.....	3 25	2 90	2 90	2 90	2 65
August 14.....	3 15	2 60	2 60	2 50	2 30
September.....	3 15	2 60	2 60	2 50	2 30
October 1.....	3 35	2 70	2 70	2 70	2 50
October 20.....	3 50	2 90	2 90	3 00	2 75
November 1.....	3 75	3 15	3 15	3 50	3 00
November 17.....	3 75	3 35	3 35	3 75	3 50
December.....	4 00	3 60	3 60	4 00	3 75

## RECORD OF AUCTION SALE AVERAGES—1879.

DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY.—F. O. B. AT HOBOKEN.

Dates.	Steamboat.	Grate.	Egg.	Stove.	Chestnut.
January 29.....	\$2 35	\$2 32½	\$2 32	\$2 75	\$2 39½
February 26.....	2 25	2 27	2 27½	2 61½	2 42½
March 26.....	2 17½	2 19¾	2 18	2 51¾	2 34
April 30.....	2 02½	2 05	2 00½	2 39½	2 28½
May 28.....	2 00	2 03¾	2 10½	2 41	2 27½
June 25.....		2 17¾	2 20½	2 53	2 41½
July 30.....		2 30	2 45	2 75	2 56½
August 26.....		2 04¾	2 15	2 33	2 20
September 24.....		1 98	2 11	2 33	2 20

DELAWARE AND HUDSON CANAL CO.—F. O. B. AT RONDOUT OR WEEHAWKEN.

March 12.....	2 17½	2 19¾	2 18	2 51¾	2 34
April 9.....	2 03½	2 05¾	2 09¾	2 48¾	2 27½
August 13.....		2 00	2 12½	2 32½	.....

The average price realized per ton, taking all sizes and the tonnage sold, is not over \$2.30 on board vessels at the shipping port. Sales by auction discontinued after the September sale, price-lists being issued instead.

## DELAWARE AND HUDSON CANAL CO'S PRICE-LISTS—1879.

Dates.	Lump.	Grate.	Egg.	Stove.	Chestnut.
January 2.....	\$2 60	\$2 70	\$2 75	\$3 10	\$2 75
January 22.....	2 60	2 60	2 60	3 10	2 60
January 29.....	2 45	2 45	2 45	2 85	2 60
February 26.....	2 35	2 40	2 40	2 75	2 60
March 12.....	2 27½	2 36	2 36	2 75	.....
March 28.....	2 25	2 25	2 25	2 60	2 35
April 1.....	2 27½	2 35	2 33	2 75	2 60
April 9.....	2 13½	2 16½	2 19½	2 58½	2 37½
May 1.....	2 20	2 20	2 25	2 55	2 50
June 2.....	2 45	2 45	2 50	2 50	2 65
July 1.....	2 55	2 55	2 60	2 90	2 75
August 1.....	2 30	2 35	2 45	2 70	2 65
August 13.....		2 10	2 22½	2 42½	.....
August 14.....	2 25	2 25	2 35	2 50	2 47½
August 27.....	2 20	2 20	2 30	2 53	2 45
October 4.....	2 45	2 45	2 55	2 73	2 70
October 20.....	2 65	2 65	2 75	2 95	2 90
November 1.....	2 90	2 90	3 00	3 30	3 45
November 13.....	3 15	3 15	3 20	3 75	3 60

## FLUCTUATIONS IN PRICES OF ANTHRACITE.

The following are said to represent the highest and lowest prices, during the years named for Anthracite, by the cargo at New York City.

L.	H.	L.	H.	L.	H.
1860.....\$5 50	\$6 00	1867.....\$6 50	\$8 50	1874.....\$4 55	\$5 55
1861.....4 20	6 00	1868.....6 50	11 50	1875.....4 40	5 55
1862.....4 25	8 50	1869.....6 50	10 50	1876.....3 75	5 55
1863.....7 00	11 00	1870.....4 50	8 50	1877.....3 25	3 75
1864.....9 00	15 00	1871.....5 00	13 00	1878.....2 75	4 50
1865.....8 50	13 50	1872.....3 75	6 25	1879.....2 15	3 25
1866.....8 50	13 00	1873.....5 00	6 50		



## THE CUMBERLAND REGION.

The Cumberland (Georges Creek) coal field, located in Alleghany county, at the western extremity of the State of Maryland, supplies an important proportion of the semi-Bituminous coal, reaching the seaboard markets. The connections with the tide-water markets are:—via the Baltimore and Ohio railroad, from the town of Cumberland 178 miles, and Piedmont, 206 miles west from Baltimore. The Chesapeake and Ohio canal, following the Potomac river to Georgetown, 184 miles, and Alexandria, 191 miles from Cumberland. The boats carry 110 tons, and make the trip in four to five days. The canal is owned by the State, and is managed by a Board of Public Works.

The mines of the George's Creek coal fields are located near to, or upon the line of the Cumberland and Pennsylvania branch road, extending through the region say, one and one-half to twenty miles from Piedmont, and from eleven to thirty-three miles from Cumberland. The mines are with one exception (the Borden shaft) drift openings in the hillside; the coal being let down inclined planes, ranging from 300 to 2,000 feet in length, to the main railroad, which follows the descent of the stream towards Piedmont.

Of the quality of the production of the mines in this district, it is almost unnecessary to speak. Its superior quality has stood the test for nearly forty years. The seam of coal worked is known to be fourteen feet in thickness; its full extent is seldom taken out, however, from various causes.

Labor in this region has always been well remunerated and there was no reduction in the price of mining the coal, from 1866, up to 1877, while on the other hand, the price of coal at the shipping points fell off about one-half within that period of time. We append a few statistics in this connection, showing the changes that have occurred:

*Rates per ton paid for digging in rooms, in Cumberland region.*

1855—June, 35 cents, at which rate it remained until August, when it was reduced to 30 cents.

1856—January, to May 1862, 30 cents.

1862—In June advanced to 40 cents, and in September to 45 cents.

1863—January, to March 1864, 50 cents.

1864—In April advanced to 60 cents, and in June to 75 cents.

1864—September, to May 1865, \$1.00.

1865—In June, reduced to 75 cents, at which it continued to May, 1866.

1866—May, to January 1877, it was reduced to 65 cents.

1877—In January, reduced to 50 cents, advanced in August to 55 cents.

1878—March, 40 cents, at which it continued until October 15, 1879.

1879—October, 50 cents at which rate till February, 1880, when it was 65 cents.

In the year 1842 the product of this coal field was shipped to tide-water market over the Baltimore and Ohio railroad, Md. The Chesapeake and Ohio canal was finished to Cumberland, in 1850.

In the fall of the year 1872, there was built a line from the Pennsylvania railroad to tap the Cumberland and Pennsylvania road, the connection being made at or near Mt. Savage.

The total business in this district since the beginning, in 1842, to the end of 1879, foots up 35,500,908 tons, divided as below:—

Baltimore and Ohio railroad.....	22,739,360 tons.
Chesapeake and Ohio canal.....	11,793,691 tons.
Pennsylvania railroad.....	967,857 tons.

The following tables will show the business that has been done from this region :—

*Forwarded by Baltimore and Ohio Railroad.*

YEAR.	TONS.	YEAR.	TONS.	YEAR.	TONS.
1842.....	1,708	1855.....	478,496	1868.....	848,118
1843.....	10,082	1856.....	502,330	1869.....	1,230,518
1844.....	14,890	1857.....	465,913	1870.....	1,112,938
1845.....	24,653	1858.....	395,405	1871.....	1,494,814
1846.....	29,795	1859.....	426,512	1872.....	1,517,347
1847.....	52,940	1860.....	493,031	1873.....	1,780,710
1848.....	79,571	1861.....	172,075	1874.....	1,576,160
1849.....	142,449	1862.....	218,950	1875.....	1,302,237
1850.....	192,606	1863.....	531,553	1876.....	1,070,775
1851.....	174,701	1864.....	329,354	1877.....	818,459
1852.....	268,459	1865.....	560,293	1878.....	924,254
1853.....	376,219	1866.....	736,153	1879.....	1,075,193
1854.....	503,836	1867.....	735,669		

*Forwarded by Chesapeake and Ohio Canal.*

YEAR.	TONS.	YEAR.	TONS.	YEAR.	TONS.
1850.....	4,042	1860.....	295,878	1870.....	604,137
1851.....	82,978	1861.....	97,599	1871.....	850,339
1852.....	65,719	1862.....	98,684	1872.....	816,103
1853.....	157,760	1863.....	216,792	1873.....	778,802
1854.....	155,845	1864.....	258,642	1874.....	767,004
1855.....	183,786	1865.....	343,202	1875.....	879,833
1856.....	204,120	1866.....	343,178	1876.....	632,440
1857.....	116,574	1867.....	458,153	1877.....	584,996
1858.....	254,261	1868.....	432,325	1878.....	609,204
1859.....	297,842	1869.....	652,151	1879.....	501,247

*Forwarded over Pennsylvania State Line Branch.*

YEAR.	TONS.	YEAR.	TONS.
1872.....	22,021	1876.....	131,866
1873.....	114,589	1877.....	170,884
1874.....	67,671	1878.....	145,864
1875.....	160,698	1879.....	154,264

Notwithstanding the adverse circumstances of a long strike, in the season that is usually the most active, the shipments of Georges Creek Cumberland coal show an increased business. With the usual tonnage for the seven weeks of idleness caused by the

strike of September and October, there would have been a total tonnage of 2,150,000 tons. The price paid for mining coal was 40 cents per ton, but on the first of September a demand for 10 cents per ton additional was made, which demand was resisted by the companies until the middle of the month of October, when the market was in such a condition to warrant the payment of this additional rate. The year was but a poor one, so far as the prices realized for the product was concerned, and but little money was paid to the stockholders of the several companies engaged in mining in this region. The average price at Georgetown, was perhaps \$2.50 per ton, and \$2.75 at Baltimore, or about 30 cents per ton less than the rate realized during the preceding year. The present year will doubtless be one of larger tonnages and we trust better results financially. There are some remarkable changes in the tonnages produced by the several companies, as will appear from the tabulated statement given below; many concerns that were credited with large tonnages in former years, appearing with but small totals for 1879. It is claimed that the amount of Big Vein coal remaining unworked five years hence will be of smaller area, and therefore recourse will be held to the smaller seams heretofore noticed in these annual reports.

The production of the several companies, during 1877-9, is shown below:—

COMPANY.	TONS—1877.	TONS—1878.	TONS—1879.
Consolidation.....	348,335	404,015	433,692
New Central.....	346,033	352,843	334,260
Borden.....	97,907	121,333	157,533
Georges Creek.....	121,553	87,910	129,932
Hampshire.....	91,516	119,476	103,584
Franklin.....	45,220	134,431	102,283
American.....	117,434	105,538	93,927
Potomac.....	63,659	56,256	75,955
Maryland.....	120,543	120,311	69,033
Atlantic.....	96,211	79,778	71,626
Swanton.....	49,096	37,620	41,579
Blæen Avon.....	33,769	28,304	40,737
Piedmont.....	35,796	27,189	15,612
Union Mining.....	3,220	3,637	2,293
North Branch.....		500	600
Totals.....	1,574,339	1,679,322	1,730,709

#### RECAPITULATION OF DISTRIBUTION FOR 1879.

	To B. & O. Railroad.	To C. & O. Canal.	To P. R. R.	Local
From Cumberland and Penn. R. R.....	889,894	397,009	154,264	43,340
From Cumberland Branch.....	135,050	104,233	.....	6,854
West Virginia Mines.....	.....	.....	.....	51
Total.....	1,024,047	501,247	154,264	50,251

In the tonnage credited to Baltimore and Ohio Railroad there is included 158,596 tons used by the company in locomotives, rolling mills, etc,

## FIRST BITUMINOUS COAL DISTRICT OF PENNSYLVANIA.

This is the most important district in the State, in point of production of this quality of coal; shipping two-thirds of the total output of Bituminous coal. It embraces the counties of Washington, Westmoreland, Fayette, Green, Somerset, Bedford, and nearly all of Alleghany. The tonnage would have been larger had the Ohio river been in navigable condition. It is recorded as an unusual fact that, from May 1 to November 15, there was no 'rise' sufficient to float coal below Pittsburgh. The coke business in this district, is an enormous and constantly increasing industry. All the coke ovens were run to their full capacity in 1879, and there are close on to 5,000 ovens in operation in this district. The production this year (1880) it is expected will reach upwards of three million tons. The following details of the mines, miners wages, etc., will be found valuable for reference.

Estimated number of miners employed in the district.....	14,788
Estimated number of other hands employed.....	3,332
Total number of persons employed, estimated.....	18,120
Estimated amount of coal produced in the whole district in tons of 2,000 pounds each exclusive of nut coal and slack for 1879.....	10,044,926
Number of mines in the district.....	248
Number of mines opened in 1879.....	13
Number of mines exhausted.....	9
Number of mines not operated in 1879.....	32
Number of mines operated in 1879.....	216
Average number of days worked at each mine.....	157
Average amount mined by each miner in tons.....	680
Average price paid for mining alone, per ton, cents.....	49.57
Average amount earned by each miner.....	\$337.07
Total number of accidents in and about the mines.....	129
Number of fatal accidents.....	35
Number of non-fatal accidents.....	93
Estimated number of tons produced per fatal accident.....	279,026
Estimated number of tons produced per non-fatal accident.....	103,069
Estimated number of tons produced for each accident.....	77,867
Number of deaths by falls in the mines in 1879.....	24
Number of deaths by wagons.....	6
Number of deaths caused by explosive gas.....	4
Number of coke ovens built in 1879 about.....	1,000

The Connellsville coking coal region, located in this district, is famous throughout the United States for the quality of the production. Its porosity and strength has given it such a reputation for a blast furnace fuel, that every coking coal elsewhere found endeavors to make a favorable comparison with the Connellsville. The region occupies a triangular shaped area of some three miles in width and fifty in length; the bed of coal worked is eight to nine feet in thickness, and being of a remarkably uniform character, is easily mined. The future of this region is regarded as unusually bright, inasmuch as the prosperity of the iron trade means a like prosperity for this quality of coal.



## MONONGAHELA REGION.

By means of its slack-water navigation, the Monongahela river is made navigable at all seasons of the year, and boats carrying eight hundred tons are passed down. The city of Pittsburgh is supplied mainly by railroad, and the larger portion of the coal by river is run down the Ohio and Mississippi to the lower markets. The following statement of shipments by the slack-water navigation, from 1845 to date, is of interest.

YEAR.	*TONS.	YEAR.	*TONS.
1845.....	184,200	1863.....	1,134,150
1846.....	311,156	1864.....	1,402,828
1847.....	385,805	1865.....	1,580,791
1848.....	392,774	1866.....	1,704,212
1849.....	398,340	1867.....	1,202,908
1850.....	491,918	1868.....	1,812,040
1851.....	490,850	1869.....	2,100,504
1852.....	585,233	1870.....	2,303,856
1853.....	624,654	1871.....	1,944,852
1854.....	693,278	1872.....	2,291,220
1855.....	849,360	1873.....	2,094,312
1856.....	353,304	1874.....	2,501,504
1857.....	1,158,939	1875.....	2,275,265
1858.....	1,027,866	1876.....	2,495,800
1859.....	1,131,467	1877.....	2,677,460
1860.....	1,517,909	1878.....	2,797,530
1861.....	834,630	1879.....	2,623,232
1862.....	743,358		

\*We have estimated 25 bushels, of 80 lbs., to the ton of 2,000 lbs.

The business done by the various railroads, entering or passing through this coal field, is indicated by the fact that in 1878, the Pennsylvania Railroad carried upwards of 2,500,000 tons from this district. In this connection, the cost of transporting coals over waterways, as from Pittsburgh to New Orleans is of value. The distance is something like 2,000 miles, the rate is about  $3\frac{3}{4}$  cents per bushel, or \$1.05 per ton of 2,240 lbs., the ordinary time being about two weeks, when all circumstances are favorable. From Pittsburgh to Louisville, Ky., the distance is 600 miles; the cost  $1\frac{3}{4}$  cents per bushel, including return of empty craft; and the time five days. Coke forms a considerable item in the business from this region. Some 107,000 tons were shipped by water in 1879. From May 1 to Nov. 15, 1879, there was no boating stage of water below Pittsburgh.

## SNOW SHOE REGION.

This region is located in Centre county, Pennsylvania. It covers an area of about eight miles in length, and some four miles in breadth, and is situated on both sides of Beach Creek. The coal finds an outlet to market, via the Bellefonte and Snowshoe, and Bald Eagle Valley connections of the Pennsylvania Railroad. The distance from Snowshoe to Tyrone, (on the main line,) is 47 miles. There is but one company mining in this district.

YEAR.	TONS.	YEAR.	TONS.
1862.....	8,260	1871.....	79,984
1863.....	12,039	1872.....	68,988
1864.....	23,593	1873.....	95,257
1865.....	51,881	1874.....	63,540
1866.....	70,890	1875.....	62,426
1867.....	58,137	1876.....	61,399
1868.....	60,149	1877.....	42,985
1869.....	89,356	1878.....	29,168
1870.....	85,276	1879.....	67,500

## NORTHERN PENNSYLVANIA SEMI-BITUMINOUS COAL FIELD.

The first coal from the Blossburg district, in this coal field, was sent to market from the "Bloss" mines in 1840. The railway from the mines connects with the Erie Railway at Corning, N. Y., the New York Central Railway at Geneva and Lyons, thus affording outlets to market, by these railways and their connections, for the coal from this region.

Since the opening of the mines of the Blossburg district, in 1840, the shipments by each company have been as follows:

Arbon Coal Company, 1840-43.....	49,633 net tons.
Wm. H. Mallory, 1844-1857.....	405,113 net tons.
D. S. Magee, 1856-59.....	78,996 net tons.
Tioga Transportation Company.....	323,174 net tons.
Salt Company of Onondaga, 1863-65.....	267,809 net tons.
Morris Run Coal Company, 1864-78.....	3,921,648 net tons.
Fall Brook Coal Company, 1860-78.....	3,592,313 net tons.
Blossburg Coal Company, 1866-78.....	2,249,674 net tons.
Total production of the district.....	10,938,343 net tons.

Details of this production are given below:

YEAR.	TONS.	YEAR.	TONS.	YEAR.	TONS.
1840.....	4,235	1853.....	45,507	1866.....	411,759
1841.....	25,966	1854.....	70,214	1867.....	481,318
1842.....	13,164	1855.....	73,204	1868.....	602,328
1843.....	6,263	1856.....	70,669	1869.....	715,094
1844.....	14,234	1857.....	94,314	1870.....	733,035
1845.....	29,836	1858.....	41,894	1871.....	815,079
1846.....	16,509	1859.....	48,393	1872.....	849,202
1847.....	29,807	1860.....	76,918	1873.....	991,057
1848.....	33,763	1861.....	112,712	1874.....	796,388
1849.....	32,095	1862.....	179,334	1875.....	581,782
1850.....	23,161	1863.....	235,843	1876.....	616,984
1851.....	25,000	1864.....	384,977	1877.....	602,245
1852.....	20,000	1865.....	394,642	1878.....	652,597

THE MCINTYRE COAL CO., whose mines are at Ralston, Pa., on the Northern Central Railway (54 miles south from Elmira, N. Y.,) which gives them an outlet both north and south to a market, commenced operations in 1870. Statistics of their business are as below:—

YEAR.	TONS.	YEAR.	TONS.
1870.....	17,802	1875.....	164,507
1871.....	106,138	1876.....	208,701
1872.....	171,420	1877.....	183,715
1873.....	212,462	1878.....	154,205
1874.....	138,907	1879.....	127,632

There was a large increase in the output of the coal grouped under the head of "Blossburg," during 1879, and the outlook for 1880 is for a still larger business. The details for 1879 are given on the next page.

The Barclay district is located in Bradford county, Pa., some thirty-six miles south from Waverly, N. Y. The mines now operated are those of the Towanda Coal Company, and the Schraeder Coal Company. The outlet to market is via the Sullivan and Erie Railroad and its connections. Details are given below of the production of coal in the district since its inception :

*The Barclay Coal Company—1856-1867.*

YEAR.	TONS.	YEAR.	TONS.	YEAR.	TONS.
1856.....	2,295	1860.....	27,718	1864.....	62,058
1857.....	6,265	1861.....	40,835	1865.....	48,375
1858.....	17,560	1862.....	52,779	1866.....	37,968
1859.....	30,143	1863.....	54,535	1867.....	30,119

Year.	Towanda Coal Co.	Fall Creek Coal Co.	Schraeder Coal Co.
1865.....	7,886	16,936	.....
1866.....	31,881	29,604	.....
1867.....	27,668	16,953	.....
1868.....	67,080	6,595	.....
1869.....	176,307	4,303	.....
1870.....	196,310	77,025	.....
1871.....	249,240	129,095	.....
1872.....	263,960	118,882	.....
1873.....	252,329	85,315	.....
1874.....	215,572	21,281	100,219
1875.....	200,424	18,507	157,686
1876.....	160,343	.....	200,795
1877.....	164,344	.....	176,755
1878.....	165,035	.....	146,285
1879.....	237,608	.....	144,945

In 1879 the Fall Brook Coal Co., mined 332,114 tons; the Morris Run Coal Mining Co., 299,859; and the Blossburg Coal Co., 242,037 tons.

### McKEAN COUNTY, PA.

In this county there is a large deposit of prime Bituminous coal. There are two points from which coal is mined and marketed at present. At the eastern portion of the basin, the Buffalo Coal Co. is at work near Clermont. The McKean and Buffalo Railroad extending from Larabees on the B., N. Y. & P. road gives an outlet to Buffalo and Rochester, the distance from the mines being 108, and 150 miles respectively, to the points named. Output of coal by the Buffalo Coal Company, since the opening of the mines.

1875.....	33,501 tons.	1878.....	72,093 tons.
1876.....	81,830 tons.	1879.....	85,745 tons.
1877.....	73,222 tons.	Total.....	346,396 tons.

We give the following analyses of three samples from the Pennsylvania Geological Survey Report of 1875:

Water.....	1.130	1.300	1.170
Volatile matter.....	33.090	39.830	35.440
Fixed Carbon.....	53.006	52.063	49.992
Sulphur.....	1.874	1.727	1.708
Ash.....	10.900	5.080	17.690

The Bradford branch of the Erie R. R. runs into the central portion of this county, and there is a small tonnage originating on this line. We have the report of the Buttsville mines operated by J. E. Butts, Jr. The annual product is about 25,000 tons. The tonnage produced since the opening of the mines to the end of 1879, is 138,563 tons in all.

## WESTMORELAND REGION.

The celebrated Penn and Westmoreland Gas coal is mined near Penn and Irwin stations, on the Pennsylvania Railroad, in Westmoreland county; the distance from Philadelphia is 332 miles. The coal mined is the great Pittsburgh bed of Bituminous coal; the companies operating in this region are large and influential, among them being the Penn Gas Coal Company, and the Westmoreland Gas Coal Company. The coal is used in every seaboard city for gas purposes, and always commands the highest price; in fact it makes the rate for all other gas producing coal that reaches the seaboard. The shipping points are South Amboy, N. J., and Greenwich, (on the Delaware river) below Philadelphia. Shipments have been as follows:—

YEAR.	TONS.	YEAR.	TONS.
1874.....	952,971	1877.....	786,039
1875.....	796,963	1878.....	692,586
1876.....	902,139	1879.....	816,302

This coal is in great favor among gas engineers in the United States.

In the dry way, by the ordinary process, the Westmoreland coal yields on an average as follows:—

Charge, 224 pounds, carbonized 3 h. 20 m., produced.....	9,500 cubic ft.
Aluminating power, standard Argand.....	16.52 candles.
Weight of coke, per ton.....	1,544 pounds.
Bushels of coke, per ton.....	40
Maximum yield of gas, per ton.....	10,642 cubic ft.
One bushel of lime purified.....	6,420 cubic ft.

## ANALYSIS OF THE COAL.

Volatile matter.....	36 per cent.
Fixed carbon.....	58 per cent.
Ash.....	6 per cent.
Value of the gas from one ton estimated in pounds of spermaceti.....	541.26 pounds.

## SONMAN REGION.

This district is in Cambria county; the coal is worked in the same vein that is mined in Clearfield county; the coal here has a heavier cover than where found in the adjoining county of Clearfield; is strong, and partakes somewhat of the nature of the gas coal found in Westmoreland county, which adjoins it on the southwest.

An analysis made of Sonman vein White Ash coal, by Dr. C. M. Cresson, gave the following results, as compared with Broad Top and Westmoreland:—

	Sonman.	Broad Top.	Westmoreland.
Volatile matter.....	13.30	17.85	32.85
Fixed carbon.....	78.60	74.65	61.45
Ash.....	2.70	7.50	5.80
Sulphur.....	0.40	1.85	1.04

The ash consists of alumina, silica and lime. Does not produce clinker. The yield of coke showed 82.30 per cent.; taking the Penn coal at 1,000 as the standard for steam purposes, Sonman coal is equivalent to 959.

Details of production are included in returns of "Allegheny" of Pennsylvania railroad report, and as the Allegheny district shipped 264,191 tons in 1879, as against 200,099 in 1878, the position maintained by the coal is apparent. Coking is being successfully carried on in this district 50,000; tons were made last year.



## BROAD TOP SEMI-BITUMINOUS COAL FIELD.

The area of this coal field is stated at eighty square miles, the larger seams range from five to ten feet in thickness, and the lesser from one to three.

Bounded on the west by Terrace Mountain and on the east by Sidelong hill, forming on the northern end a synclinal prong, resting its terminal point on the Juniata river below the town of Huntingdon. The coal field widens towards its southern boundary in Bedford and Fulton counties, ending in a number of terminal fingers.

The coal measures are regular in structure, with gentle undulations dividing the field into several synclinals or basins. The coal is semi-Bituminous in its nature, and has been largely used for blacksmithing purposes, for generating steam in locomotives, marine and stationary engines, in rolling mills, puddling furnaces and forge fires; with glass works it is an especial favorite. It gives a white ash, is free burning and easily ignited.

An outlet for the coal from the region is afforded by the Huntingdon and Broad Top Mountain Railroad (this was completed in 1856, and during the latter part of that year 42,000 tons were forwarded from this region to various markets.) The line extends from the town of Huntingdon, on the Pennsylvania Railroad, 203 miles west of Philadelphia, to Mt. Dallas in Bedford county, a distance of 45 miles. At Saxton, 24 miles from Huntingdon, a branch road, 10 miles in length, extends to Broad Top City; at Riddlesburg, 5 miles beyond Saxton, is a branch into Fulton, 5 miles from the main road.

From Mt. Dallas the Bedford and Bridgeport Railroad, 386-10 miles in length, extends to the Maryland State line; from this point to Cumberland, Md., via the Cumberland and Piedmont Railroad, is 7 miles. This connection gives an outlet for the Cumberland coal to the interior markets of Pennsylvania, to Philadelphia and South Amboy, N. J. The Bedford and Bridgeport road is leased to the Pennsylvania Railroad and operated by them.

The yearly shipments from this region, by the H. & B. T. R. R., have been as follows:

YEAR.	TONS.	YEAR.	TONS.	YEAR.	TONS.
1856.....	42,000	1864.....	386,645	1872.....	297,473
1857.....	78,813	1865.....	315,906	1873.....	350,245
1858.....	105,478	1866.....	265,720	1874.....	226,693
1859.....	130,595	1867.....	244,412	1875.....	204,923
1860.....	186,903	1868.....	280,936	1876.....	159,779
1861.....	272,625	1869.....	360,778	1877.....	140,143
1862.....	333,606	1870.....	313,425	1878.....	150,224
1863.....	305,673	1871.....	319,625	1879.....	140,143

The East Broad Top Railroad penetrated this coal field in 1875, and delivered to the Pennsylvania R. R. 53,567 tons of coal during that year, 66,104 in 1876; 54,738 in 1877, 63,068 in 1878 and 67,929 in 1879. In addition some 41,767 tons were last year used in the furnaces on the line of the E. B. T. road.

The shipments of Cumberland coal over the Pennsylvania State line, and Huntingdon & Broad Top railroad, have been as below:—

YEARS.	TONS.	YEARS.	TONS.
1872.....	22,021	1876.....	145,796
1873.....	114,589	1877.....	187,488
1874.....	67,671	1878.....	163,598
1875.....	175,154	1879.....	187,488

## MYERSDALE REGION.

This district is located in Somerset county, Pennsylvania, adjoining the Cumberland region, of Maryland, and the coal is stated to be similar to, and an extension of the Cumberland coal basin. The coal is of the same quality and will yield a similar quantity per acre. The centre of the basin is thirty-eight miles from Cumberland, Md., and the coal finds an outlet to Baltimore and the seaboard markets via the Pittsburgh branch of the Baltimore and Ohio Railroad. The Keystone Coal Company have been at work here since 1872, and built up a business amounting to 69,313 tons in 1877, (58,566 tons in 1879.) The property of the company is advantageously situated for the shipment of its production, and the rate of transportation from the mines to market is very favorable. The Cumberland and Elk Lick Coal Company own 1,500 acres of land in this district, and during 1876 sent to market some 39,919 tons, which was increased to 79,363 tons in 1877; 42,444 tons in 1878; and 70,560 tons in 1879. In our last review we looked for an increased business from this region, and the result proves the correctness of our anticipations, for the total shipments were 176,126 tons, or an increase over the preceding year of 55,000 tons. In addition to the two companies noted above, there were 16,800 tons by the Baltimore and Cumberland, 13,400 tons by the Cumberland, 16,800 tons by the Salisbury Company. All these figures will doubtless be increased this year, as special attention has been drawn to the coals of this region.

The first coal seam rests on a thin floor of fire clay. The coal bed has two benches; the lower, 18 inches thick, is an impure Cannel coal, circling to block structure; the upper is a medium quality of semi-Bituminous coal with the well-marked columnar structure peculiar to Allegheny coals.

The interval between this and the next small coal seam is composed of thin plates of sandstone with olive-colored shales.

The second workable seam (B) is pre-eminently *the bed* of the lower system of coal measures; not perhaps, so much from its size and good quality of coal, as from its ready and sure identification, wherever it exists, by the massive bed of limestone on which it rests.

The coal in this bed is columnar in structure with plates of mineral charcoal disseminated. In structure and quality it is closely associated with the best Clearfield coal. It will be found a superior fuel for iron working.

The third seam (C) is all pure coal of an excellent quality; but as the bed is high in the measures and does not occupy a wide area in this portion of the field, it has as yet received little attention.

The Geological Survey report, states: "In general character the coal from the Pittsburgh bed in the Salisbury basin resembles the coal coming from the same bed in the Cumberland basin. The similarity is sufficiently great to render it sure that for all steam raising purposes it should take a high rank. The percentage of sulphur runs very low on the average; and the coal is an efficient and clean fuel for puddling furnaces and rolling mills."

An analysis made by the Chemist of the survey shows, 1.665 water; 22.350 volatile matter; 68.774 fixed carbon; 1.246 sulphur; ash 5.965. Coke, per cent., 75.985. Color of ash, gray, with pink tinge.

## CLEARFIELD REGION.

This coal field is located in Clearfield and Centre counties, in the central portion of the State of Pennsylvania; for an outlet for the product of its mines it is dependent upon the Tyrone and Clearfield branch of the Pennsylvania Railroad, extending from Tyrone on the main line, (224 miles west from Philadelphia,) to Clearfield, 41 miles. The Pennsylvania Railroad Company own the railroads, the shipping wharves, and all the means of access to the markets of the Atlantic seaboard; the advantage of being connected with a railroad of such magnitude, with its wonderful ramifications and connections, gives the coal proprietors of this region great facilities for the proper conduct of their business, and it is owing to the very liberal policy of this corporation, that the district has been enabled to take the rank which it has assumed, in connection with the fuel supply of the seaboard. The figures given of the production, show that the demand for this quality of coal has steadily increased, while that of other districts fell off. Statistics of the product from the beginning are as below, in tons of 2,000 lbs:—

1867.....	169,219 tons.	1874.....	639,630 tons.
1868.....	171,238 tons.	1875.....	928,297 tons.
1869.....	259,994 tons.	1876.....	1,281,861 tons.
1870.....	379,863 tons.	1877.....	1,374,927 tons.
1871.....	542,896 tons.	1878.....	1,295,201 tons.
1872.....	431,915 tons.	1879.....	1,631,120 tons.
1873.....	592,860 tons.		

The report of the Geological Survey, gives the coal of this region an exceptional character for purity and freedom from sulphur. The coal is used for steam purposes under stationary, marine, or locomotive engines, for making iron and steel rails, for glass works, in lime kilns, and many other purposes, being much liked wherever used; ignites freely, burns readily, and leaves a white ash. It is not easily friable, and bears transportation remarkably well. The analysis of Clearfield coal shows an average of about 70 per cent. carbon, and 22 per cent. volatile matter, leaving eight per cent. water, sulphur and ash. The highest per centage of carbon, as per table of analysis made by Geological Survey, is 74.284, found by analysis of Franklin coal. One of the tables, however, makes an exception in favor of Moshannon colliery, giving a carbon percentage of 74.779 but with an excess of water, ash and sulphur. The new Moshannon coal shows, by the same table, 71.199 per cent. of carbon, with a high percentage of volatile matter. The low percentage of impurities, ash and sulphur, is an indication of the value of Clearfield coal. The amount of volatile combustible matter and fixed carbon, less the ash and sulphur, is the working force, and these coals carry fully ninety per cent.

In view of the many disadvantages that the entire coal trade labored under during the major portion of the year 1879, the figures of the product recorded for that year are truly remarkable, and prove the correctness of everything that we have heretofore said as to the good quality of this coal. Mining is carried on at all seasons of the year, and the rate paid is therefore more remunerative than in other districts. At present the price per ton is sixty cents, as against forty, at this time last year. Railroad tolls are seventy-five cents per ton higher than at the opening of business in 1879. The outlook is for a large tonnage at profitable prices for the year 1880.



## THE KANAWHA (W. VA.) REGION.

The coal measures of West Virginia underlay nearly sixteen thousand square miles of territory, of which, what are known as the Kanawha and New River Valleys, traversed by the Chesapeake & Ohio railroad, hold eight thousand. Several varieties of coal occur, among which are:—Cannel, Splint, Gas and Bituminous. Of the Bituminous there are seams of different degrees of hardness or texture, from the friable coking coal similar to the best Newcastle (England) coals, to the harder Splint coals, with regular cleavage similar to the Youghiogeny coals so largely in demand in our Western and Southern cities; of so compact a nature that it can be used in the blast furnace in its raw state. The Bituminous coals are excellent steam raising fuels, and have been used on steamers, railways, and under stationary engines with good results. The Gas coal seam is productive of a most excellent quality of coal that has been used in both the Eastern and Western markets with most satisfactory results.

The value and importance of the Kanawha coal district, as a source of supply from which good caking coals can be obtained, is beginning to be understood and appreciated by gas manufacturers. These coals have established a high reputation where they have been tested and used, for the quantity, purity and illuminating power of the gas which they produce.

The business from this region is increasing, and the present year is expected to show a still further enlargement of the tonnage moved by the railway company passing through this territory. We have following comparative details for 1878-9.

Distribution.	Tons, 1878.	Tons, 1879.
For use of C. & O. Railway Company .....	78,250	74,925
On line of road west of Richmond.....	28,187	26,473
At Huntington for shipment on Ohio river.....	10,673	69,341
To connecting railroads .....	34,463	29,555
At Richmond for consumption.....	50,004	47,300
At James river wharves for shipment.....	140,921	155,827
Total coal mined and carried.....	342,480	304,422

This shows an increase of about 18 per cent., in 1879 over 1878. The increase of over 500 per cent. in the shipment westward, down the Ohio, is an evidence that the movement, so long predicted by those familiar with the relations of the Kanawha coal field to the Ohio markets, has at last begun. The increase of about 11 per cent. in the shipments from Richmond, mainly to Northern cities, and during a period of business depression, shows that the superior coals from this region are meeting with increased sales in that direction. There is a considerable increase in the manufacture of coke, and a business of 60,000 tons annually is looked for, within a short time.

The appended analyses of the coals mined and coke made, along the New River and Kanawha Valleys will repay perusal.

OF THE COALS.	Cannel.	Gas coal.	Quinnimont.	Nuttalburg.
Fixed Carbon.....	23.70	56.65	75.89	70.67
Volatile matter.....	58.00	35.75	18.19	25.35
Moisture.....		1.03	0.74	1.35
Ash.....	18.50	5.18	4.98	2.10
Sulphur.....		1.32	.....	0.57
OF THE COKES.	Sewell.	Nuttalburg.	Quinnimont	Quinnimont
			No. 1.	No. 2.
Fixed carbon.....	93.00	91.22	93.85	91.72
Ash.....	6.73	7.53	5.85	5.09
Sulphur.....	0.27	0.92	0.30	0.43



## WEST VIRGINIA GAS COAL.

That class of gas coal known in the New York and Eastern markets as "West Virginia Gas Coal," is mined in Marion, Taylor, Ritchie and Preston counties, West Virginia, the mines being located near to or upon the main line of the Baltimore and Ohio railway. The coal is used for gas making in the cities of the seaboard, and is very favorably spoken of. The distances to Baltimore are as follows: From Clarksburg, 301 miles; from Fairmount, 302 miles; from Newburg, 263 miles; from Tunnelton, 260 miles; from Cairo, 355 miles.

The veins are from six to eleven feet in thickness. Analyses of these coals have given the following results:

	Volatile matter.	Fixed carbon.	Ash.
Clarksburg, main seam.....	56.74	41.66	1.60
Clarksburg Cannel.....	49.21	45.43	5.36

During the past year the Montauk coal has appeared in market, and Prof. Doremus gives the following as the analysis of a sample submitted to him:

Carbon.....	80.8200	Moisture.....	1.0500
Hydrogen.....	5.5200	Ash.....	3.8400
Oxygen and nitrogen .....	8.4706	Sulphur.....	0.2994

The business of the district is stated to be about four hundred thousand tons, with prospects of increasing, as the shipments East and West will be large this year. In addition to the outlet eastward via Baltimore and Ohio railroad, there is the Parkersburg route due west, crossing the Monongahela river at Clarksburg, and thence to the Ohio river at Parkersburg; and the Wheeling route northwestward, crossing the Monongahela at Fairmount, thence down the creek to the Ohio, and thence up the river to Wheeling. Both these branches enter the main coal measures near the crossing of the Monongahela above named, and traverse them to the Ohio. At Clarksburg and northward, down the Valley of the Monongahela, is one of the richest coal regions of West Virginia. One of the beds in the neighborhood of this town measures from ten to twelve feet in thickness, with a thinner bed of more highly Bituminous nature underlying; from some distance above Clarksburg, they may be followed with scarcely an interruption throughout the whole Valley of the Monongahela, northward to Pittsburgh.

The statistics of shipments to Baltimore are not to be had for last year, but our estimate is a fair one.

YEAR.	TONS.	YEAR.	TONS.
1868.....	165,772	1874.....	131,703
1869.....	209,158	1875.....	177,316
1870.....	249,879	1876.....	127,293
1871.....	189,763	1877.....	103,035
1872.....	217,569	1878.....	140,000
1873.....	190,673	1879.....	165,000

The coal from this region should take a large portion of the trade, and with the fostering care of the B. & O. road which is promised this year, we may look for a large increase. It compares very favorably with the best gas coals from other sources. The large quantity of hydrogen shows that it must yield large volumes of gas, while the small quantity of sulphur is especially noticeable. Gas made per gross ton is stated at 12,839 cubic feet of 16 candle illuminating power; coke 37½ bushels of 45 lbs.

## THE CONNELLSVILLE COKE REGION.

Of the coking coal fields of the United States, that which enjoys the most enviable reputation is the Connellsville. It is situated in the southwestern part of the State of Pennsylvania, lying mainly in the counties of Westmoreland and Fayette, and distant some 50 to 60 miles from Pittsburgh. The field occupies a triangle some three miles wide and fifty miles long, almost without a fault, the beds yielding from 8 to 9 feet of workable coal.

The continuation of the Pittsburgh area of the bed with the Connellsville area is broken off by the Youghiogheny, the bed taking an upward course and descending again, the intermediate portion being swept away. This has led to a popular belief that the bed at Connellsville is different from the bed at Pittsburgh, but careful surveys have established their identity. It is a fact, however, that at Pittsburgh this bed is not in its best condition, while at Connellsville it is at its largest size and finest quality. In the Connellsville basin, the coal ranges from 8 to 11 feet in thickness, with one small slate parting the "bearing in slate" 18 inches above the floor. The roof is only passable; rooms can only be run 12 feet wide, and the pillars left will average 10 feet, a large amount of which is lost in drawing. The floor is even and quiet, and the coal of a remarkably good and uniform character, soft and easily mined.

The coal is Bituminous, with generally a dull resinous luster, alternating with seams of bright, shining crystalline coal, coated with a yellowish silt. It contains numerous particles of slate, and some crystals of pyrites. It is compact, with a tendency to break up into cubes.

The coke from this region is of silvery lustre, cellular, with a metallic ring, tenacious, comparatively free from impurities, and capable of bearing a heavy burden in the furnace. Its porosity and ability to "stand up" in the furnace are what have given it such a reputation for a blast furnace fuel, and created such demand for it for mixing with Anthracite and Bituminous coal in the East and West, especially where an open iron, such as is used in the Bessemer process, is needed.

In coking the coal, the beehive oven is in universal use in the Connellsville region. These ovens vary, at the different works, from 11 to 12 feet in diameter, and from 5 to 6 feet in height. The working is very simple. The coal is dumped through an opening in the crown of the furnace, and spread evenly on the floor, to the average depth of 2 feet for 48-hour coke and 2½ feet for 72-hour. The front opening, through which the coke is discharged, is at first nearly closed with brick, luted with loam. The heat of the oven from the previous coking fires the charge, and as the coking progresses, the air is more and more shut off by luting the openings, and finally closing the roof openings. The average charge is 100 bushels of coal at 76 lbs., and the yield in coke, 120 bushels at 40 lbs., making the percentage yield 63, or 1.6 tons of coal to 1 ton of coke. The average time of coking is 48-hours, with 72-hours for that burned over Sunday; 24-hour coke is sometimes made. The 72-hour coke is firmer coke than either of the others, but it is questionable whether it is a better furnace coke. When the coke is thoroughly burned the door is removed, and the coke is cooled by water thrown in from a hose, and then drawn.

The statistics of this trade are surprising. The manufacture began in the winter of 1841-2. According to the latest information we have, there are 5,000 ovens in the Connellsville region, and nearly all are in operation. Annual output is 2,500,000 tons.

## BOSTON, MASS.

The receipts are shown below:—

From	Tons—1876.	Tons—1877.	Tons—1878.	Tons—1879.
Alexandria, Virginia.....	49,643	77,956	36,408	19,457
Georgetown, District of Columbia.....	12,945	10,150	58,046	61,140
Philadelphia, Pennsylvania .....	639,643	696,837	732,449	805,679
Baltimore, Maryland.....	151,118	157,553	173,432	219,681
Other places (New York, etc).....	294,221	272,781	304,469	710,764
Great Britain.....	6,177	22,952	18,823	18,971
Nova Scotia .....	26,451	36,330	20,260	18,318
Total.....	1,180,204	1,274,559	1,343,887	1,854,010

\*This coal is mainly for gas making.

The receipts of foreign and domestic coal at this port have been :—

Years.	Foreign.	Domestic,	Years.	Foreign.	Domestic.
1879.....	37,289	1,816,721	1871 .....	109,013	822,808
1878.....	39,083	1,304,804	1870.....	115,022	819,890
1877.....	59,282	1,215,277	1869.....	110,466	764,017
1876.....	32,628	1,147,576	1868.....	103,901	742,481
1875.....	32,444	1,200,578	1867.....	117,440	680,221
1874.....	51,438	1,125,516	1866.....	159,380	676,376
1873.....	87,700	1,076,673	1865.....	209,225	538,917
1872.....	90,739	1,068,781	1864.....	188,786	516,665

These figures include all the coal arriving at this port for the home trade, and for the points reached by railroads centering here.

The following are the highest and lowest prices for Anthracite coal, by the cargo, for the years named, as per statistics of the *Commercial List*:—

Years.	Prices.	Years.	Prices.
1879.....	\$4 00 @ \$6 50	1875.....	\$7 00 @ \$9 00
1878.....	5 00 @ 6 50	1874.....	7 00 @ 9 00
1877.....	4 50 @ 7 00	1873.....	8 00 @ 10 00
1876.....	6 00 @ 8 25	1872.....	7 00 @ 10 00

The imports of foreign coal, either for Gas or Steam, were very small during 1879; the quantity was about evenly divided between British and Colonial coals. It is expected that the business during 1880 will show a large total. The changes in the ports of shipment are indicated from the large tonnage credited to New York ports; this nearly divides the Anthracite trade now, where in former years it was Philadelphia.

## BUFFALO, N. Y.

The coal received at this city is distributed to the trade for family use; to the local manufactories and gas works; to the interior trade for gas works, family use and manufacturing purposes; the West is supplied principally with Anthracite from this port, the coal being taken at low rates of freight in return grain vessels to Chicago, Milwaukee, Duluth, etc.

The receipts for a series of years have been as below :—

	BITUMINOUS.			—ANTHRACITE.—	
	By Lake.	By Canal.	By Rail.	By Canal.	By Rail.
1863.....	71,323	12,551	.....	123,319	.....
1864.....	65,214	35,237	.....	154,214	.....
1865.....	68,141	42,322	.....	143,998	.....
1866.....	68,142	62,172	.....	248,716	.....
1867.....	101,107	67,124	.....	223,718	.....
1868.....	91,457	73,596	.....	318,353	.....
1869.....	99,460	108,972	.....	112,914	187,000
1870.....	94,796	163,437	.....	177,027	250,000
1871.....	88,511	80,660	76,063	102,185	300,000
1872.....	78,879	95,500	109,397	190,994	300,000
1873.....	87,724	125,000	190,000	255,044	479,885
1874.....	67,467	70,000	140,000	252,262	320,000
1875.....	32,767	45,000	350,000	250,206	500,000
1876.....	21,418	30,000	297,842	151,175	350,000
1877.....	44,247	10,000	214,200	209,609	550,000
1878.....	50,001	13,353	425,973	115,162	660,000
1879.....	36,648	12,000	637,022	92,134	1,000,000

The Bituminous *by canal*, was Blossburg coal.

The shipments of Bituminous eastward by canal from Buffalo were as below:—

YEARS.	TONS.	YEARS.	TONS.
1863.....	20,125	1872.....	53,193
1864.....	30,943	1873.....	68,210
1865.....	28,283	1874.....	46,995
1866.....	50,202	1875.....	23,100
1867.....	57,495	1876.....	19,153
1868.....	59,766	1877.....	29,250
1869.....	62,690	1878.....	39,820
1870.....	65,900	1879.....	28,290
1871.....	60,522		

In addition to the Bituminous *by rail*, add for Blossburg coal 60,000 tons in 1879, 45,000 tons in 1878, 50,000 tons in 1877, 25,000 tons in 1876, 75,000 tons in 1875, 50,000 tons in 1874, 80,000 tons in 1873.

Shipments of Anthracite, west via the Lake:—

1873.....	510,443 tons.	1877.....	405,074 tons.
1874.....	344,500 tons.	1878.....	306,172 tons.
1875.....	339,722 tons.	1879.....	550,646 tons.
1876.....	321,455 tons.		

The freights to Chicago opened at forty cents per ton; continued about this figure until September when they advanced to seventy-five cents; in October reached one dollar and closed on November 18, at \$1.25.



## SAN FRANCISCO, C L.

The statements given below will serve to indicate the consumption of the several varieties of coal at San Francisco. The principal sources of supply are, from Mt. Diablo, in the immediate vicinity; from Coos Bay in Oregon; and Seattle in Washington Territory; from Vancouver Island; from Australia and Great Britain; as also Cumberland and Anthracite, from the Atlantic coast; coal has also been received in small quantities from Chili, Sitka, Alaska and Japan, while the domestic sources of supply are constantly on the increase as the schedules show :—

Years,	Total Receipts.	Years.	Total Receipts.
1860.....	77,635	1870.....	320,493
1861.....	116,245	1871.....	315,194
1862.....	120,545	1872.....	434,467
1863.....	135,550	1873.....	454,582
1864.....	167,298	1874.....	531,947
1865.....	150,147	1875.....	538,209
1866.....	192,601	1876.....	648,388
1867.....	248,925	1877.....	576,760
1868.....	282,025	1878.....	626,834
1869.....	328,973	1879.....	618,519

Details of business for the years 1876—1879 are as below ;—

FOREIGN.	Tons—1876.	Tons—1877.	Tons—1878.	Tons—1879.
Australian.....	131,695	100,513	131,678	80,175
English.....	121,948	89,362	44,005	36,588
Vancouver Island.....	100,965	102,421	140,323	160,142
Chili.....	3,150	8,145	.....	.....
DOMESTIC.				
Mount Diablo.....	108,078	96,172	122,034	134,435
Coos Bay.....	41,286	30,941	35,124	45,909
Bellingham Bay.....	21,335	10,475	2,820	.....
Seattle.....	95,314	102,333	116,008	135,012
Rocky Mountain.....	226	133	371	.....
Ione, California.....	.....	3,458	765	.....
Ounalaska.....	.....	190	450	.....
Buckeye.....	.....	41	.....	.....
Carbondale, California.....	.....	177	4,022	1,229
EASTERN.				
Cumberland.....	12,520	21,791	8,069	1,777
Anthracite.....	11,871	10,608	21,064	21,982
Making the totals of.....	648,388	576,760	626,834	618,519

The ton weight is that of 2,240 lbs.

Of the foreign source of supply, Vancouver's grows; while the British and Australian are falling off, the local supplies are increasing very largely; the coals from the Atlantic coast do not hold their own. The price of Eastern coals is against their general use. The Vancouver coals are taking the place to a large extent of Liverpool, West Hartley, etc., for domestic uses.

## CINCINNATI, OHIO.

The coal received at this city includes Youghiogheny, from the neighborhood of Pittsburgh, Pa., the Pomeroy from the vicinity of Pomeroy, Ohio; Hocking Valley, Ohio; Muskingum, Ohio; Ohio river; the Kanawha from West Virginia, including the Splint, Bituminous and Cannel, and the Anthracite from Pennsylvania.

The shipments of coal from this city to interior towns amounted to 6,494,600 bushels against 4,973,300 in 1877-8.

The following table will show the number of bushels of coal of all kinds, received at Cincinnati, for the years named:—

YEARS.	BUSHEL.	YEARS.	BUSHEL.
1853-54.....	8,158,000	1866-67.....	18,446,226
1854-55.....	10,356,000	1867-68.....	17,500,000
1855-56.....	7,500,000	1868-69.....	25,500,000
1856-57.....	14,500,000	1869-70.....	30,300,000
1857-58.....	15,000,000	1870-71.....	22,972,000
1858-59.....	12,392,701	1871-72.....	30,790,796
1859-60.....	14,600,000	1872-73.....	37,274,497
1860-61.....	12,500,000	1873-74.....	35,234,834
1861-62.....	8,500,000	1874-75.....	35,360,300
1862-63.....	8,000,000	1875-76.....	40,183,317
1863-64.....	15,975,366	1876-77.....	39,622,634
1864-65.....	16,467,023	1877-78.....	38,892,229
1865-66.....	18,022,990	1878-79.....	34,210,667

It is safe to calculate the bushel at eighty pounds, which would give twenty-eight to the ton of 2,240 lbs.

## DETAILS FOR THE SEASON 1878-79.

Pittsburgh or Youghiogheny, by river.....	20,769,027 bushels.
Ohio River.....	4,068,462 bushels.
Kanawha River.....	6,134,039 bushels.
Muskingum and Hocking, by rail.....	885,500 bushels.
Anthracite, by rail.....	768,750 bushels.
Washington, Piedmont and other coals.....	1,584,899 bushels.

The receipts have been smaller than for seven years past, but the deficit is in Pittsburgh coal, which owing to the low water, did not come to hand. The railroad coals profited by this circumstance both in price and tonnage. The business in Anthracite coal, stimulated by low rates, was largely increased over the preceding year, and the coal entered into more general consumption. Prices were the lowest ever known, Wilkes-Barre coal having been delivered on cars, at wholesale, at times as low as \$4 per ton, while Lehigh was relatively as low. This was brought about by competition between the railroads, all the trunk lines from the east to this city having been engaged. The average quotation for Anthracite during 1879, delivered, was \$6.67 per ton, compared with \$7.58 in the preceding year, and \$8.33 in 1876-77.

## BALTIMORE, MD.

At this city there is an extensive business in coal, both Anthracite and Bituminous. Locust Point, the terminus of the Baltimore and Ohio Railroad, on the environs of this fine city, is the shipping point for the Bituminous coal from the Cumberland region of Maryland, the Gas coal regions of West Virginia, the Somerset county mines, and the York and Schuylkill Gas coal of Pennsylvania.

The trade in Anthracite is entirely local, none being shipped from Baltimore to other and more distant points. It is received by the following named routes :—By Northern Central Railway from Millersburg, Pa., 112 miles, the Lykens Valley Red Ash. By the same route from Sunbury, Pa., 138 miles, the White Ash. By Susquehanna tide-water canal, coal from the Wyoming Valley. Schuylkill from Philadelphia, via river and canal. All the sales are 2,240 pounds to the ton. Anthracite sold as high as \$13.50 per ton for lump coal, in May, 1865.

The shipments of Bituminous coal, foreign, were as below :—

YEAR.	TONS.	YEAR.	TONS.
1872.....	54,363	1876.....	27,336
1873.....	59,546	1877.....	27,189
1874.....	70,675	1878.....	32,804
1875.....	63,460	1879.....	28,059

The Northern Central Railroad carried the following Anthracite :—

YEAR.	TONS.	YEAR.	TONS.
1872.....	244,757	1876.....	263,954
1873.....	242,754	1877.....	343,936
1874.....	232,938	1878.....	310,042
1875.....	276,784	1879.....	412,169

The Pennsylvania Railroad began to carry the Bituminous coal from the Clearfield region of Pennsylvania, to Baltimore, in 1875, by its Northern Central line, (to Canton,) and there has been considerable business for this quality of coal, developed in this vicinity.

The range in price of Cumberland coal at this port is as stated below :—

YEAR.	PRICES.	YEAR.	PRICES.	YEAR.	PRICES.
1871.....	\$4 72	1874.....	\$4 63	1877.....	\$3 34
1872.....	4 66	1875.....	4 42	1878.....	3 00
1873.....	4 85	1876.....	3 93	1879.....	2 75

The business in coal in 1879 was larger than during the preceding year. There was no money made on contracts however, owing to the strike of the miners and the advance paid on vessels freights. At the opening of the season Cumberland sold at \$2.75, and after the strike, say October and November, at \$3.25. Receipts of coal at Locust Point, 1,218,257 net tons, as against 1,087,785 the preceding year. There are about 150,000 tons of Gas coal received annually including that for shipment, and for local use, mainly from the Taylor county, W. Va., mines.

## RICHMOND, VA.

This city is assuming considerable importance in the coal trade, through the efforts of the Chesapeake and Ohio Railroad, to build up a trade for the shippers. We append statistics of the total coal business of the Chesapeake and Ohio Railroad :—

Quality.	Tons—1875.	Tons—1876.	Tons—1877.	Tons—1878.	Tons—1879.
Cannel.....	39,795	52,980	42,000	47,699	29,697
Splint and Bituminous.....	176,050	194,660	245,995	277,041	353,133
Coke.....	25,580	28,535	36,070	17,700	20,592
Totals.....	242,025	276,175	324,065	342,480	403,422
Shipments of coal to Eastern cities were..	90,715	112,690	124,980	140,921	155,827

The following statement of coal receipts at the Richmond market, for the city consumption, taken from official returns, will not be without interest :—

Character of coal.	1874.	1875.	1876.	1877.	1878.	1879.
Chesapeake and Ohio.....	8,524	21,556	29,285	50,656	54,552	64,117
Anthracite and Cumberland.....	58,545	46,193	40,983	46,875	39,709	60,120
Chesterfield, etc., etc.....	57,869	55,844	39,868	36,010	34,621	40,377
Totals.....	124,938	123,593	110,136	133,541	128,882	164,614

In 1879; of the miscellaneous coal, 23,715 tons were Midlothian, via R. & D. R. R., 9,776 tons, via R. & P. R. R., 3,065 tons Bighthope by water, and 3,821 tons by James River and Kanawha Canal. For coal trade of Kanawha region, see chapter under that head.

## MOBILE, ALABAMA.

The coal used at this point, is mainly from Alabama, and although not large as yet, the quantity is said to be increasing. The coal is received by rail, and is sold at \$3.75 per ton in car load lots. There have been shipments made to Texas and to New Orleans. The Pennsylvania coal received is for the gas works. Foreign coal came in as ballast last year, and was sold cheap. Years end with the 31st of August.

	1879.	1878.	1877.	1876.
Tons, Alabama coal.....	3,015	1,349	1,466	2,141
Tons, Penna. and English coal.....	3,352	2,689	8,069	2,851

For the calendar year 1879, the receipts were 4,607 tons Alabama, and 2,132 tons of all other coal. In addition thereto, some 2,000 tons of Alabama coal was received and forwarded to other points. Captains of steamers report the Alabama coal equal to the Pittsburgh or English coals to be had at Gulf ports. We are indebted to Mr. W. H. Leslie, for these details.



## ST. LOUIS, MO.

By far the largest proportion of the Bituminous received at this city is from the Belleville district, in St. Clair county, Illinois. The principal seam worked is five to seven feet in thickness, and is economically mined. Analysis of this coal shows—water, 6; volatile matter, 38.8; fixed carbon, 52.2; ash, 5. The Iron Mountain Railroad brings the semi-Anthracite coal, known as the “Spadra,” from Arkansas, to this city.

Mr. Geo. H. Morgan sends us the following statement of the receipts of coal at St. Louis, for the year 1879, with a comparison for 1872:—

By Ohio and Mississippi Railroad.....	3,884,875 bushels.
By Indiana and St. Louis Railroad.....	145,900 bushels.
By St. Louis, Vandalia and T. H. Railroad.....	8,294,300 bushels.
By Belleville and Southern Railroad.....	9,058,475 bushels.
By Wabash Railroad.....	2,940,825 bushels.
By St. Louis and South-eastern Railroad.....	4,637,725 bushels.
By Illinois and St. Louis Railroad.....	5,503,900 bushels.
By Cairo and St. Louis Railroad.....	1,001,425 bushels.
From Ohio River.....	474,125 bushels.
From St. Louis county—estimated.....	1,000,000 bushels.
By St. Louis, Alton and Chicago.....	36,000 bushels.
Total.....	36,978,150 bushels.

Twenty-five bushels of eighty pounds each, to the ton of 2,000 lbs.

The receipts of Coke in 1879, were 4,173,500 bushels, as against 1,097,750 in 1878. A recapitulation of the coal trade is given below:—

YEAR.	BUSHEL.	YEAR.	BUSHEL.
1872.....	24,557,425	1876.....	32,073,125
1873.....	32,608,795	1877.....	35,856,850
1874.....	29,823,050	1878.....	32,087,300
1875.....	32,466,650	1879.....	36,978,150

We have no details of the quantity of Anthracite dealt in at this city, but it is growing in favor, from the low price at which it has been furnished.

## MONTREAL, P. Q.

There is an increasing business done in coal at this city. There was more Anthracite sent in last year than in preceding years, notwithstanding the duty of fifty cents per ton, which was levied by the Dominion, upon American and British coal, last year for the first time in the history of the trade. The American duty of seventy-five cents has been imposed on Provincial coal, since August, 1872, and this action of the Dominion Government was intended as retaliatory, and to foster the consumption of the Provincial coal in the Canadas. We append statistics for 1879.

Receipts from Great Britain.....	62,532 tons.
Receipts from Maritime Provinces.....	117,256 tons.
Receipts from United States.....	125,915 tons.

Some 300 tons of that imported from the United States was Cumberland, the remainder Anthracite. In 1877, 105,000 tons, and 1878, 88,000 tons Anthracite was received. In 1877, 150,839 tons Bituminous of all kinds, and in 1878, some 138,080 tons.

## MILWAUKEE, WIS.

The bulk of the coal received is by lake. The details for 1878, are as below:—

Anthracite, by lake.....	111,545 tons.
Bituminous, by lake.....	125,787 tons.
Bituminous, by rail.....	3,658 tons.

There is about one-fourth of the quantity received annually distributed by rail to the interior. Receipts have been as follows, by lake.

1861.....	31,608	1870.....	122,865
1862.....	21,860	1871.....	175,526
1863.....	43,215	1872.....	210,194
1864.....	44,503	1873.....	229,784
1865.....	36,369	1874.....	177,655
1866.....	66,616	1875.....	228,674
1867.....	74,568	1876.....	188,444
1868.....	92,992	1877.....	264,784
1869.....	87,690	1878.....	239,667

## PROVIDENCE, R. I.

The receipts of coal at this point, in tons of 2,240 lbs., in 1879, were 740,835 tons domestic of all kinds, and 1,364 tons of foreign. Details of receipts are as below:—

1871.....	517,906	1876.....	610,339
1872.....	633,296	1877.....	645,311
1873.....	637,344	1878.....	576,158
1874.....	539,168	1879.....	742,199
1875.....	603,510		

## ERIE, PENNA.

The coal received at this city amounts to half a million tons annually, of which perhaps one-half is Anthracite. There is a large transfer business to vessels, for shipment up the lakes. The harbor of Erie is open, on the average, fourteen days earlier than that of Buffalo. The rail trade is large, and consists of the shipment of both Anthracite and Bituminous to points west. The shipments by lake have been as below:—

YEAR.	TONS.	YEAR.	TONS.
1868.....	259,012	1874.....	217,500
1869.....	309,434	1875.....	174,672
1870.....	312,081	1876.....	233,012
1871.....	377,457	1877.....	232,326
1872.....	350,159	1878.....	224,553
1873.....	325,711	1879.....	350,000

### NEW ORLEANS, LA.

The coal receipts at this city, during the year ending December 1, 1879, was half a million barrels ( $2\frac{1}{2}$  bushels) less than during the previous year, and was due to the high rates prevailing the latter half of the year. The total arrivals, were 137 boats (9000 bbls. each) and 57 barges (4,500 bbls. each). The consumption of coal during the year amounted to 243 boats and 53 barges of Pittsburgh coal, and 6 boats and 11 barges of Kentucky coal. Prices ranged from 25 cents to 70 cents per bbl., at wholesale. Anthracite does not form any considerable feature of the trade, so little is done in it that no statistics are kept of the arrivals. Excepting during the fall months of 1879, when Pittsburgh coal was so high and scarce, but few cargoes of Anthracite coal were received. The preference is decidedly for Pittsburgh and other bituminous coals.

The coal brought to this market is almost exclusively Pittsburgh coal. The flats and barges are towed by powerful towboats built expressly for that purpose. The towing between Pittsburgh and Louisville depends on the state of the river. When the stage of water is too low for navigation, which it frequently is for weeks, and even months, the supplies at the lower points become deficient, and prices naturally advance, often reaching very high prices. The coal flats and barges sent to New Orleans are generally dropped at Willow Grove, near Greenville, just above the city, where they are superintended for the owners or agents. When a boat or barge is wanted, a small city tug-boat is sent to tow it to the city, or to its destination on the coast. Messrs. C. A. Miltenberger & Co., give the following as the consumption of Pittsburgh coal at this port:—

YEAR.	BBLs.	YEAR.	BBLs.
1869.....	3,317,000	1875.....	2,448,000
1870.....	3,203,500	1876.....	2,802,700
1871.....	3,112,000	1877.....	3,014,200
1872.....	3,991,500	1878.....	2,999,600
1873.....	2,821,500	1879.....	2,421,100
1874.....	2,749,500		

In addition to the figures for 1876, add some 84,000 barrels of St. Bernard coal, from Kentucky; for 1877, 56,000 barrels; for 1878, 90,000 barrels; for 1879, 105,000 barrels. It is estimated that eleven barrels make a ton of 2,000 pounds. The distance from Pittsburgh to New Orleans is some 2,000 miles, and the rate of freight is about three and one-half cents per bushel.

### NEW HAVEN, CONN.

Coal of all kinds received during 1879, amounted to 650,200 tons, as against 458,700 tons in 1878.

### BRIDGEPORT, CONN.

Receipts during 1879, amounted to 200,250 tons, as compared with 144,580 tons during 1878.

## CHICAGO, ILL.

This city is supplied with Anthracite coal at low rates from the fact that the bulk of the supply comes by the Lakes, as return freight to the grain vessels loaded here. As a result it appears that although the railway system connecting this city with many of the Western Bituminous coal fields is so complete, the amount of Anthracite received, is nearly thirty per cent., of the sum total.

The receipts for the years 1877—1879 are shown below :—

Received by	Tons—1877.	Tons—1878.	Tons—1879.
Lake.....	804,759	730,000	746,829
Illinois and Michigan Canal.....	8,828	9,569	4,327
Chicago and Northwestern Railroad.....	2,949	96	144
Illinois Central Railroad.....	28,274	24,953	7,331
Chicago, Rock Island and Pacific Railroad.....	35,876	29,595	36,216
Chicago, Burlington and Quincy Railroad.....	49,923	22,255	35,443
Chicago and Alton Railroad.....	283,213	391,461	541,998
Chicago and Eastern Illinois Railroad.....	178,146	206,817	307,127
Lake Shore and Michigan Southern.....	78,978	89,248	155,208
Pittsburgh, Ft. Wayne and Chicago Railroad.....	102,241	160,709	198,249
Pittsburgh, Cincinnati and St. Louis Railroad.....	105,012	90,335	119,739
Baltimore and Ohio Railroad.....	22,236	6,918	25,703
Michigan Central Railroad.....	48,574	70,023	206,323
<b>Total.....</b>	<b>1,749,091</b>	<b>1,832,033</b>	<b>2,384,974</b>

## RECEIPTS BY LAKE.

YEARS.	ANTHRACITE.	TONS.	YEARS.	BITUMINOUS.	TONS.
1870.....		340,730	1870.....		181,850
1872.....		495,765	1872.....		90,820
1873.....		533,837	1873.....		199,107
1874.....		395,680	1874.....		261,790
1875.....		518,971	1875.....		272,831
1876.....		362,373	1876.....		334,055
1877.....		442,325	1877.....		360,158
1878.....		325,553	1878.....		404,447
1879.....		464,360	1879.....		282,469

## TOTAL RECEIPTS AT THE CITY OF CHICAGO.

YEARS.	TONS.	YEARS.	TONS.	YEARS.	TONS.
1852.....	46,233	1862.....	218,423	1871.....	1,081,472
1853.....	38,543	1863.....	284,196	1872.....	1,398,024
1854.....	56,774	1864.....	323,275	1873.....	1,668,257
1855.....	109,576	1865.....	344,854	1874.....	1,359,496
1856.....	93,020	1866.....	496,193	1875.....	1,641,488
1857.....	171,379	1867.....	546,208	1876.....	1,619,033
1858.....	87,290	1868.....	658,243	1877.....	1,749,091
1859.....	131,204	1869.....	799,000	1878.....	1,832,033
1860.....	131,081	1870.....	887,474	1879.....	2,384,974
1861.....	184,089				

The ton weight designated in these tables is that of 2,000 pounds.

The above details are compiled by the Board of Trade. We find slight discrepancies, as compared with the statistics of the Chicago Coal Exchange and append details furnished by them.

Receipts by Rail of Bituminous coal.....	1,266,576 tons.
Receipts by Lake of Bituminous coal.....	300,024 tons.
Receipts by Canal of Bituminous coal.....	3,579 tons.
Receipts by Rail of Anthracite coal.....	375,715 tons.
Receipts by Lake of Anthracite coal.....	464,876 tons.

There is a total of 491,961 tons of coal of all kinds distributed by rail to interior points.



## CLEVELAND, OHIO.

This city receives a fine and varied assortment of Bituminous coal. A great many coal basins—in fact, nearly all the Ohio formation, as well as most of the coals lying west of the Allegheny mountains, in Pennsylvania—here find a market and a distributing point for the West, Northwest, Eastern and Canada trade. The great number of vessels employed in the iron ore and lumber trade naturally seek coal as a back freight or for ballast, which enables Cleveland to place coal in distant ports, like Chicago, Milwaukee and on Lake Superior, at merely nominal rates. The business has been developed within the last fifteen years, and taking the rapid growth of the manufacturing interest in the West, into consideration, it is safe to presume that the coal trade has not yet reached its ultimate proportions.

The total receipts of coal at Cleveland, from 1828 to 1852, amounted to 662,862 tons; having increased from thirty tons in 1828, to 137,926 tons in 1852; we have no details from that date until 1865, but the following will serve to show the growth of the trade:

YEAR.	TONS.	YEAR.	TONS.
1865.....	465,550	1873.....	1,599,212
1866.....	583,407	1874.....	1,215,353
1867.....	668,026	1875.....	1,414,124
1868.....	759,104	1876.....	1,250,531
1869.....	922,757	1877.....	1,363,345
1870.....	904,600	1878.....	1,310,838
1871.....	1,165,940	1879.....	1,576,807
1872.....	1,348,160		

The receipts for 1879, are divided as below:—

Bituminous coal by rail .....	1,019,984 tons.
Bituminous coal by canal.....	206,136 tons.
Bituminous coal at Newburgh (18th ward).....	275,000 tons.
	<hr/> 1,500,620 tons.
Anthracite coal by rail.....	63,368 tons.
Anthracite coal by lake.....	12,819 tons.
	<hr/> 76,187 tons.

Lake shipments of Bituminous coal.

	1875.	1876.	1877.	1878.	1879.
To ports in British Provinces.....	140,637	156,857	80,243	61,869	46,174
To domestic ports.....	531,177	372,834	549,320	597,412	580,610

There were 21,396 tons of Anthracite sent into the interior by rail, so that the total remaining for Cleveland consumption was 54,791 tons Anthracite, and 874,336 tons of Bituminous coal.

Important railway connections that are being made with the coal fields of Ohio, (beyond those already possessed) tend to the opinion that this city will more than maintain its position as the centre of distribution of coal for the west and northwest. It now receives four times as much as Erie, and eight times as much as Ashtabula; the receipts are equal to those of Chicago, when Bituminous alone is considered. The figures for 1879 approach those of 1873, very nearly, and are larger than any previous year with that one exception.

## PITTSBURGH, PA.

Situated as it is, in the midst of a coal-producing country, and having so many connections by rail and water, with coal and iron deposits, this city has taken a high position among the industrial centres of the United States.

The business that is done here in the course of the year is most difficult to ascertain, as the railway companies do not separate their tonnage into that carried *through*, and that for local use. It is safe to estimate the sum total from the immediate vicinity, at 5,500,000 tons. This is mainly forwarded to points North, South, East and West, by rail and water. The shipments of coal and coke by the river to points below the city last year amounted to 2,623,232 tons. The coal shipped down the Ohio river is obtained from receipts through the medium of the Monongahela slack water navigation system, and the coal carried by the Saw-mill Run railway. This is classed as "River" coal, and perhaps half a million tons would represent the portion left for local consumption at Pittsburgh, Allegheny, etc. The amount of "Rail" coal left for local use may be estimated at double this quantity.

We give elsewhere the facts and figures furnished by the Inspectors of Mines for the first and second bituminous coal districts of Pennsylvania. They are specially tributary to the city of Pittsburgh, and a recapitulation will not be out of place here. The first district has 241 mines, of which 90 are on the Monongahela and Youghiogheny rivers, independent of railway facilities; the total output of the mines was ten million tons, and employment in and about gave a livelihood to 18,120 persons, beside a number employed in contingent occupations of shipping, maintaining the necessary road, machinery, barges, steamers, etc. In the second district 61 mines are in operation, half of them in Clarion and Mercer counties, accessible by the Allegheny Valley and Erie & Pittsburgh and branches, and therefore under the influence of the capital and labor of Pittsburgh; 1,581,120 tons were produced last year, and employment given to 3,428 persons directly, besides numerous lines of trade dependent upon the coal trade.

The coke industry forms an important feature in this report of the coal trade of Pittsburgh: it is the growth of but a few years, for we find statistics of 1875, showing a business of but 666,495 tons, while estimates of the present business foot up to four times this amount annually. In the coke-making business there are firms owning thousands of ovens, who make it for sale, and there are also mines and ovens producing this coke for use at furnaces. It will not be many months before the Eastern blast furnaces of the Schuylkill and Lehigh Valleys run on at least a portion of coke, as the result proves a better quality of iron made, with less injury to the furnaces, as compared with using all Anthracite coal.

The Pittsburgh coal is the principal coal bed of Southwestern Pennsylvania, and most of the mineral fuel which is mined along the Youghiogheny and Monongahela rivers, to be used in the coke ovens of the Connellsville region, and in the blast furnaces and mills and factories of Pittsburgh and its vicinity, and to be shipped to western and southern markets, comes from this bed. It is the great bed of the Cumberland coal basin in Maryland, and a small fragment of the bed remains in the highest summit of Broad Top, in Blair county. From all the rest of the State the bed has been removed by erosion; but there is good reason for believing that it formerly extended beyond the Susquehanna river, and that it has been preserved as one of the beds of the Anthracite regions.

## PRICE OF COAL AT PITTSBURGH, PA.

PRICE OF COAL RUN OVER 1½ INCH SCREEN, F. O. B. CARS UNION YARD, PITTSBURGH, PA.—THESE PRICES ARE FOR ONE HUNDRED BUSHELS.

Months.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
January.....	\$7 50	\$7 50	\$7 50	\$9 50	\$8 00	\$5 50	\$5 50	\$6 00	\$5 75	\$5 00
February.....	7 50	7 50	7 50	9 50	7 50	5 50	5 50	5 75	4 75	5 25
March.....	7 50	7 50	7 50	9 50	8 00	6 50	5 25	5 75	4 75	5 00
April.....	7 50	7 50	7 50	9 50	8 00	6 50	5 25	5 75	4 75	4 75
May.....	7 50	7 50	7 50	9 50	8 00	6 25	5 25	5 75	4 75	4 75
June.....	7 00	7 50	7 50	9 50	7 50	6 25	5 25	5 25	4 75	4 75
July.....	7 00	7 50	7 50	9 50	7 50	6 00	5 25	5 25	4 00	4 75
August.....	7 00	7 50	7 50	9 50	7 50	6 00	5 25	5 75	4 00	4 75
September.....	7 50	7 50	8 00	9 50	7 00	5 50	5 25	5 75	4 00	4 75
October.....	7 50	7 50	8 75	9 50	7 00	5 50	5 25	5 75	4 25	5 50
November.....	7 50	7 50	Δ9 10	8 50	7 00	5 50	5 25	5 75	4 25	B6 60
December.....	7 50	7 50	9 50	8 50	6 50	5 50	4 75	5 75	4 25	6 00
Average.....	7 37	7 50	7 98	9 33	7 46	5 87	5 25	Δ 6 1/2	4 52	5 15

General average for ten years is \$6.61.—Average for last five years is \$5.30.

A—Price made by R. R. Coal Exchange from November, 1872 until November, 1873.

B—Price advanced on account of decision of Arbitrators.

Highest price is \$9.50. Lowest price is \$4.00.

## PRICES PAID FOR MINING PITTSBURGH COAL.

PRICE OF COAL MINING ON RAILROADS ENTERING CITY OF PITTSBURGH FOR COAL RUN OVER A 1½ INCH SCREEN—PER 100 BUSHELS.

Months.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
January.....	\$4 00	\$4 00	\$4 00	\$4 00	\$4 00	\$5 00	\$4 00	\$2 75	\$2 50	\$3 00	\$2 66	\$2 66
February.....	4 00	4 00	4 00	4 00	4 00	5 00	4 00	2 50	2 50	3 00	2 66	2 66
March.....	4 00	4 00	4 00	4 00	4 00	5 00	4 00	3 00	2 50	2 50	2 66	2 50
April.....	3 50	4 00	4 00	4 00	4 00	5 00	4 00	3 00	2 50	2 50	2 50	2 28
May.....	3 50	4 00	4 00	4 00	4 00	5 00	3 75	3 00	2 50	2 50	2 50	2 28
June.....	3 50	4 00	3 50	4 00	4 00	5 00	3 50	3 00	2 50	2 50	2 50	2 28
July.....	3 50	4 00	3 50	4 00	4 00	5 00	3 50	3 00	2 50	2 50	1 90	2 28
August.....	3 50	4 00	3 50	4 00	4 00	4 00	3 50	3 00	2 50	3 00	1 90	2 28
September.....	3 50	4 00	4 00	4 00	4 00	4 00	3 25	2 50	2 50	3 00	2 28	2 40
October.....	4 00	4 00	4 00	4 00	4 50	4 00	3 00	2 50	2 50	3 00	2 28	2 75
November.....	4 00	4 00	4 00	4 00	5 00	4 00	3 00	2 50	2 37	3 00	2 28	B3 50
December.....	4 00	4 00	4 00	4 00	5 00	3 20	3 00	2 50	Δ2 00	3 00	2 28	3 00
Average.....	3 75	4 00	3 87	4 00	4 20	4 51	3 55	2 77	2 45	2 79	2 36	2 57

Ranges from \$1.75 (in December 1876) to \$5.00 (1872 and 1873.)

A—Three prices this month viz \$1.75—\$2.00 and \$2.25—average \$2.00.

B—Paid according to decision of Board of Arbitrators.

General average—for twelve years \$3.40—for last five years \$2.59.

## IMPORTS AND EXPORTS.

The tariff from 1824 to 1843, was six cents per bushel, or \$1.68 per ton; from 1843 to 1846, \$1.75 per ton; 1846, 30 per cent. ad valorem; 1847 to 1861, 24 per cent. ad valorem; 1862-3-4, \$1.00 per ton; 1865, \$1.10; 1866 to 1872, \$1.25 per ton; since August, 1872, 75 cents per ton. During the period from June, 1854, to March, 1866, the Reciprocity treaty was in force, and coal from the British possessions in North America, was admitted into the United States, duty free. The imports of coal into the United States, since 1821, have been:

YEARS.	TONS.	YEARS.	TONS.
1821 .....	22,419	1851 .....	214,774
1822 .....	34,672	1852 .....	183,015
1823 .....	30,535	1853 .....	231,508
1824 .....	20,440	1854 .....	252,865
1825 .....	25,795	1855 .....	287,408
1826 .....	34,643	1856 .....	293,507
1827 .....	40,264	1857 .....	360,712
1828 .....	32,364	1858 .....	396,628
1829 .....	45,463	1859 .....	403,928
1830 .....	58,582	1860 .....	398,986
1831 .....	36,508	1861 .....	465,434
1832 .....	72,978	1862 .....	541,099
1833 .....	92,432	1863 .....	624,378
1834 .....	71,626	1864 .....	567,733
1835 .....	59,968	1865 .....	684,180
1836 .....	108,432	1866 .....	696,093
1837 .....	153,450	1867 .....	521,305
1838 .....	129,082	1868 .....	396,128
1839 .....	181,555	1869 .....	423,566
1840 .....	162,867	1870 .....	420,638
1841 .....	155,394	1871 .....	443,955
1842 .....	141,521	1872 .....	490,631
1843 .....	41,163	1873 .....	456,015
1844 .....	87,073	1874 .....	498,028
1845 .....	85,766	1875 .....	441,600
1846 .....	156,853	1876 .....	407,853
1847 .....	148,021	1877 .....	497,260
1848 .....	196,168	1878 .....	578,467
1849 .....	198,213	1879 .....	491,473
1850 .....	180,439		

The exports of coal have been as below:—

YEAR.	TONS.	YEAR.	TONS.
1870 .....	227,918	1875 .....	519,345
1871 .....	277,951	1876 .....	568,076
1872 .....	401,078	1877 .....	740,456
1873 .....	584,633	1878 .....	660,138
1874 .....	763,402	1879 .....	662,916

Years are to June 30.—U. S. Gov't, fiscal year.



The imports and exports for the calendar years named, have been as below, in tons of 2240 lbs :—

	1875.	1876.	1877.	1878.	1879.
IMPORTS, Bituminous.....	411,723	488,132	498,275	566,938	449,167
EXPORTS, Anthracite.....	361,669	362,044	377,979	312,273	421,992
Bituminous.....	234,997	253,387	324,839	345,347	221,371

The imports are from Australia and British Columbia to San Francisco; from Great Britain to the Atlantic and Pacific coasts; from Nova Scotia to Atlantic coast ports.

We are indebted to the Bureau of Statistics for the following details of the exports from the United States, for the calendar year 1879, of coal produced in the States:—

COUNTRIES.	TONS ANTHRACITE.	TONS BITUMINOUS
Austria.....	391	.....
Belgium.....	.....	500
Brazil.....	277	662
Central American States.....	322	79
Chili.....	494	.....
China.....	1,925	.....
Danish West Indies.....	3,935	6,178
France.....	940	.....
French West Indies.....	604	3,302
Miquelon, Langley and St. Pierre Islands.....	697	.....
French Possess. in Africa and adjoining Islands.....	50	.....
Germany.....	1	.....
England.....	1	1,680
Gibraltar.....	.....	480
Nova Scotia, New Brunswick, &c.....	41,808	2,991
Quebec, Ontario, Manitoba, &c.....	325,736	125,097
British Columbia.....	72	43
Newfoundland and Labrador.....	846	10
British West Indies.....	2,119	853
British Guiana.....	.....	211
British Possess. in Australasia.....	520	.....
Hawaiian Islands.....	1,097	61
Italy.....	650	.....
Japan.....	1,872	.....
Mexico.....	3,390	383
Netherlands.....	96	.....
Dutch East Indies.....	932	.....
Peru.....	290	.....
Portugal.....	95	.....
Azores, Madeira and Cape Verde Islands.....	52	.....
San Domingo.....	43	10
Spain.....	185	.....
Cuba.....	28,268	65,166
Porto Rico.....	62	.....
Turkey in Africa.....	100	.....
United States of Columbia.....	3,051	13,248
Uruguay.....	.....	104
Venezuela.....	663	621
All other countries in Africa.....	10	.....
Total.....	421,594	221,699

## GREAT BRITAIN.

## MINERALS PRODUCED IN GREAT BRITAIN.

MINERALS.	Tons raised in 1875.	Tons raised in 1876.	Tons raised in 1877.	Tons raised in 1878.
Coal.....	131,867,105	133,344,766	134,610,763	132,607,866
Iron ore.....	15,821,060	16,841,583	16,692,802	15,726,370
Copper ore.....	71,528	79,252	73,141	56,094
Tin ore.....	13,995	13,688	14,142	15,045
Lead ore.....	77,746	79,096	80,850	77,350
Zinc ore.....	23,973	23,613	24,405	25,438
Iron pyrites.....	48,035	48,809	43,948	29,867
Arsenic.....	5,061	4,228	4,809	4,991
Manganese.....	3,205	2,796	3,038	1,586

## METALS OBTAINED FROM THE ORES ENUMERATED.

	1875—Tons.	1876—Tons.	1877—Tons.	1878—Tons.
Iron pig.....	6,365,462	6,555,997	6,608,664	6,381,051
Tin.....	9,614	8,500	9,500	10,106
Copper.....	4,322	4,694	4,486	3,952
Lead.....	57,435	58,667	61,403	68,020
Zinc.....	5,715	6,641	6,281	6,309
Silver ( <i>ounces</i> ).....	487,358	483,422	501,435	425,119

Absolute total value of the metals and coal, with other minerals which are not smelted, (except building stone, lime, slate, and common clay,) produced in the United Kingdom:—

	1875.	1876.	1877.	1878.
Value of the metals produced.....	£18,476,746	£18,668,818	£18,742,960	£18,283,124
Value of the coal.....	46,163,486	46,670,668	47,113,767	46,412,753
Value of other minerals.....	2,847,456	2,887,367	2,424,679	2,643,404
Total.....	£67,487,688	£68,226,853	£68,281,406	£67,339,281

The ton weight in all cases is 2,240 lbs.

The report, by ROBERT HUNT, Keeper of the Mineral Statistics of Great Britain, gives the output of the 3,768 collieries in operation, as below:—

District.	Tons.	District.	Tons.
North Durham and Northumberland.....	11,423,334	Shropshire.....	830,575
Cumberland.....	1,388,233	Gloucestershire.....	1,147,605
South Durham.....	18,710,550	Somersetshire.....	693,000
Westmoreland.....	4,540	Monmouthshire.....	4,490,290
Cheshire.....	686,575	NORTH WALES.—Flintshire.....	707,785
Lancashire, North and East.....	8,634,500	Denbighshire.....	1,513,900
Lancashire West.....	9,425,525	Anglesea.....	672
Yorkshire, West Riding.....	15,581,970	SOUTH WALES.—Glamorganshire.....	12,144,250
Yorkshire, North Riding.....	6,840	Cardiganshire.....	625,000
Derbyshire.....	7,190,000	Pembrokeshire.....	37,000
Nottinghamshire.....	4,107,350	Brecknockshire.....	119,975
Warwickshire.....	1,025,450	SCOTLAND, East.....	11,667,559
Leicestershire.....	1,020,500	SCOTLAND, West.....	6,169,723
Staffordshire, South.....	9,130,774	IRELAND.....	121,915
Staffordshire, North.....	4,072,416		

The receipts of coal at London, for a series of years, have been as below:—

YEAR.	By Sea.	By Canal.	By Rail.	Total.
1865.....	3,161,683	8,532	2,733,056	5,903,271
1866.....	3,033,193	10,176	2,969,896	6,013,215
1867.....	3,016,416	9,965	3,295,652	6,322,03
1868.....	2,918,230	9,527	2,979,333	5,907,090
1869.....	8,873,688	6,941	3,341,585	6,212,214
1870.....	2,993,710	7,301	3,758,039	6,759,100
1871.....	2,762,712	6,615	4,449,141	7,218,468
1872.....	3,548,918	8,236	4,999,268	7,556,422
1873.....	2,665,630	11,195	5,147,413	7,824,288
1874.....	2,727,719	5,982	4,689,785	7,423,486
1875.....	3,134,846	4,594	5,065,452	8,204,892
1876.....	3,273,443	4,696	5,173,237	8,451,375
1877.....	3,170,601	4,608	5,426,204	8,501,413
1878.....	3,198,309	2,977	5,593,290	8,794,576
1879.....	3,508,526	2,910	6,547,395	10,058,811

Of the receipts in 1879, some 2,364,927 tons were afterward conveyed beyond the limits, leaving 7,693,884 tons as consumed in the city.

The following will show the exportation of coal since 1854:—

YEARS.	TONS.	YEARS.	TONS.
1854.....	4,300,000	1867.....	10,415,787
1855.....	4,900,000	1868.....	10,837,804
1856.....	5,800,000	1869.....	10,588,425
1857.....	6,600,000	1870.....	11,495,002
1858.....	6,500,000	1871.....	12,851,957
1859.....	7,000,000	1872.....	13,211,961
1860.....	7,400,000	1873.....	12,712,222
1861.....	7,200,000	1874.....	13,927,205
1862.....	7,600,000	1875.....	14,475,036
1863.....	7,500,000	1876.....	16,299,077
1864.....	8,809,908	1877.....	15,420,050
1865.....	9,170,477	1878.....	15,483,816
1866.....	9,053,721	1879.....	16,435,642

The coal raised in 1876 was used by the several industries named, in the proportions stated below:—

Used for steam power.....	23.52 per cent.
Domestic consumption.....	17.20 per cent.
In the manufacture of pig iron.....	15.21 per cent.
In the manufacture of merchant iron and steel.....	15.00 per cent.
Exported.....	9.27 per cent.
Consumed in and about coal mines.....	6.25 per cent.
For the manufacture of gas.....	5.87 per cent.
For steam navigation.....	3.00 per cent.
Locomotives and engines on railways.....	1.88 per cent.
Waterworks, breweries, etc.....	1.35 per cent.
Smelting tin, copper, lead, etc.....	0.80 per cent.
Consumed in and about the mines.....	0.47 per cent.
For use in army department.....	0.18 per cent.

## COAL IN FRANCE.

Statistics of the output are given below, in metric tons of 2,204 lbs.

YEAR.	TONS.	YEAR.	TONS.
1787.....	215,000	1870.....	13,179,708
1802.....	844,180	1871.....	13,240,135
1811.....	773,694	1872.....	16,100,773
1820.....	1,093,658	1873.....	17,485,786
1830.....	1,862,665	1874.....	17,059,547
1840.....	3,003,382	1875.....	16,949,032
1850.....	4,433,567	1876.....	17,104,794
1860.....	8,309,622	1877.....	16,877,200
1865.....	11,652,755	1878.....	17,096,500

Official statements for the first half of 1879, give the output as 8,331,138 tons. Mr. Varillemin, states that the consumption amounts to something like 24,000,000 tons annually, as the exports are 700,000 tons, and the imports are 8,000,000 tons. Of the exports Belgium takes 10 per cent.; Switzerland takes 14 per cent.; Italy 36 per cent.; and there is sent coastwise and foreign, the remaining 40 per cent. Of the imports Belgium furnishes 50 per cent.; England 36 per cent.; and Germany 14 per cent.

The inferiority of the French miners to English colliers is shown by the fact that the average output of a miner in the department of Nord or Pas de Calais is only 152 tons per annum, while that of a Durham collier is 333 tons, or more than double; also that the cost per ton of coal put on the rail is nearly 9s., while in Durham it does not exceed 5s. Complaint, however, is made by French colliery owners that they are exposed on the west and north to English competition, on the northeast to Belgian, and on the east to German; and that they cannot, therefore, get the prices for coal they would think satisfactory.

What is called Anthracite is found in the departments of the Nord, Sarthe, Mayenne, Isere, and Calvados, and the output is one and a quarter million tons. Lignite is found in Isere, Haute-Saone, Vaucluse and Bouches-du-Rhone. In the other basins coal only is mined. Something like two million tons is made into coke annually. Large amounts of artificial fuel are made annually from the slack or debris.

## COAL IN SWITZERLAND.

In the Valais, is found Anthracite coal with the following component parts by analysis: Carbon, 88.16; hydrogen, 2.15; oxygen and nitrogen, 1.34; Ash, 8.35. The quantity of coal used in the country, is 500,000 tons annually, and it is all imported. The use of American Anthracite in Europe has attracted attention to the Valais coal, and no doubt the local supply will be developed.

## COAL IN CHILE.

The coal is of a lignitic character, and amounts to a yearly business of 400,000 tons, of which 50,000 tons are exported. On the contrary, 125,000 tons are imported from Great Britain.



## COAL IN THE GERMAN EMPIRE.

This country, as now consolidated, is one of the largest producers of coal in Europe. Since 1870, the Empire includes old Prussia, Saxony, Bavaria, and the States of the Zollverein. The product of coal of all kinds in the whole of the German States, amounts to something like fifty million tons annually. The grand total of the output in 1871, when the consolidation of the Empire was completed, was 37,852,464 tons of 2,240 lbs. Of the quantity now sent out of the pits, Prussia is to be credited with 89 per cent.

*Output of COAL in the Empire, as now constituted.*

YEAR.	TONS.	YEAR.	TONS.
1848.....	4,383,585	1872.....	33,306,418
1857.....	11,279,266	1873.....	36,392,280
1867.....	23,808,071	1874.....	35,918,614
1868.....	25,704,758	1875.....	37,436,563
1869.....	26,774,368	1876.....	38,454,428
1870.....	26,397,770	1877.....	39,423,774
1871.....	29,373,272	1878.....	39,429,308

*Output of LIGNITE in the Empire, as now constituted.*

YEAR.	TONS.	YEAR.	TONS.
1848.....	1,417,420	1872.....	9,018,048
1857.....	3,587,855	1873.....	9,752,914
1867.....	6,994,818	1874.....	10,739,532
1868.....	7,174,365	1875.....	10,367,686
1869.....	7,569,545	1876.....	11,096,034
1870.....	7,605,234	1877.....	10,644,427
1871.....	8,482,838	1878.....	10,971,617

## COAL IN BELGIUM.

The coal area of the Kingdom is stated at 510 square miles; as will be seen from the figures given below, the production is quite large, having averaged something like fifteen million tons annually, for some years past. There is an export trade of about 3,600,000 tons to France and Germany, and an import of 900,000 tons from Great Britain.

The progress of the extraction of coal has been as below, in metric tons of 2,204 lbs.

YEAR.	TONS.	YEAR.	TONS.
1830.....	2,345,797	1869.....	12,943,994
1835.....	2,557,097	1870.....	13,697,118
1840.....	3,929,962	1871.....	13,733,176
1845.....	4,919,156	1872.....	15,658,948
1850.....	5,820,884	1873.....	15,778,401
1855.....	8,409,330	1874.....	14,669,029
1860.....	9,609,895	1875.....	15,011,331
1865.....	11,840,703	1876.....	14,329,578
1866.....	12,774,662	1877.....	13,938,523
1867.....	12,755,822	1878.....	14,899,175
1868.....	12,298,559		

Artificial Fuel is made to the extent of perhaps half a million tons annually. The consumption of coal within the State is something like ten and a half million tons. To produce the coal mined in 1878, 300 mines were opened and 81,032 men employed. The wages average about sixty cents per day.

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COAL IN SWEDEN.

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The coal basins of Sweden are few and far between. There are, in fact, only two districts where coal is found, the principal one being in the southerly province of Skania, and particularly in that portion of the province which forms the government of Malmöhus. The other coal district is in the neighborhood of the village of Engelholm, on the borders of the province of Christianstadt, but it is possibly only an extension of the former, both belonging to the Triassic or Jurassic age. The total output is about 90,000 tons. The Höganas is the oldest and most important basin, and contains three principal beds of different qualities, but none of them approaching a first-class coal. They are not well adapted for coking, which is unfortunate considering the extent and value of the Swedish iron trade. Nearly the whole of the foreign importation of coal is from Great Britain, and this is now about one million tons a year.

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COAL IN ITALY.

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But little true coal is mined in this country, although there is said to be good coal and Anthracite in the Province of Udine. Of the Lignite there are 125,000 tons raised annually, and 95,000 tons of Peat. Great Britain sends 1,500,000 tons of coal to this State annually.—The 'Annuario Statistico' states that the fuel resources of Italy comprise a few beds of Anthracite coal of very limited area, and some beds of lignite of tertiary eocene and miocene age. These are found at Valdegno, near Vicenza, Grosseto, Murlo, near Siena, Sarzana, near Spezia, St. Giovanni, near Florence Candino, near Bergamo, and at Gonnesa, on the south-western coast of Sardinia. There are also considerable deposits of peat at the foot of the Alps, of which over 90,000 tons are annually raised."

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COAL IN INDIA.

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Since our last annual, we find considerable in reference to the extent of the coal fields of the British Empire in India; but few statistics of the production. The total area of the Indian coal fields is estimated at upwards of 30,000 square miles, the largest but three in the world—United States with 500,000, China with 400,000, and Australia with 240,000. In India the amount of coal raised varied a good deal from year to year with a supply of sea-borne coal in the market, the latter depending very much on the amount of tonnage available. The supply of coals which had been imported from Australia to India during the last twenty years had now nearly dwindled to nothing. The Indian coals are inferior to English and Australian, although they accomplish good work in locomotives; and, but for the expense of land carriage, no doubt they would be employed to the exclusion of all foreign sea-borne coal. The consumption in British India per annum in locomotives and factories is stated by one authority as being at present 1,000,000 tons, of which one-half was raised from Indian mines, the remainder coming from England, France, and Australia. Other authorities give four millions as the production of native coal.

## VANCOUVER'S ISLAND.

This island is located on the western coast of North America, within the limits of the Dominion of Canada. The coal area is estimated at 390 square miles. San Francisco, (Cal.) receives a large percentage of the output. The shipments have been :—

YEAR.	TONS.	YEAR.	TONS.
1870.....	29,863	1875.....	110,145
1871.....	45,000	1876.....	140,087
1872.....	46,148	1877.....	154,052
1873.....	45,723	1878.....	190,640
1874.....	81,397	1879.....	228,974

Tons are stated at 2,240 lbs.

## COAL IN NEW SOUTH WALES.

One of the most important coal-producing countries of the globe is that portion of Australia, known as New South Wales; the trade has sprung up within a very few years, and the outlook for the trade is most encouraging, as the coal has been found equal to the English steam coal, and adopted by the Home government; the approximate area of the coal fields is 24,840 square miles; the production from the opening of the mines up to the year 1874, amounted to 12,387,279 tons. Production has been as below :

YEAR.	TONS.	YEAR.	TONS.
1829.....	780	1872.....	1,012,426
1839.....	21,283	1873.....	1,002,852
1849.....	48,516	1874.....	1,261,351
1859.....	303,213	1875.....	1,253,475
1869.....	919,774	1876.....	1,319,918
1870.....	868,564	1877.....	1,444,171
1871.....	898,784	1878.....	1,550,000

## COAL IN SPAIN.

The consumption of coal in Spain is equal to one and a half million tons per annum, and it is estimated that there is sufficient coal within the State to furnish the supply at least 1250 to 1500 years. Mining for coal dates from 1742, but the output until 1825, was of trifling amount. There is a true Bituminous coal and a Lignite. The Provinces from which the supply is extracted are Leon, Castile and the Asturias. The extent of coal producing area has been set down at something like 3501 square miles. The following tabular statement is of interest. The quantities expressed are metric tons of 2,204 lbs.

YEAR.	COAL.	LIGNITE.	IMPORTATIONS.
1830.....	10,524		
1840.....	19,248		
1850.....	62,923	10,000	185,491
1860.....	320,899	18,952	452,479
1865.....	461,396	34,359	394,806
1870.....	621,832	40,095	566,911
1871.....	589,707	43,824	534,897
1872.....	687,791	33,460	592,567
1873.....	658,744	20,938	619,243
1874.....	695,340	13,346	580,708
1875.....	628,810	25,689	704,287
1876.....	675,926	30,888	774,770
1877.....	699,500	30,000	837,053
1878.....	730,000	35,000	771,409

## COAL IN RUSSIA.

Coal mining in Russia has not met with any great attention, from the amount of wood yet available. The supply of mineral however, is something enormous, and calculations have been made showing a supply equal to possible demands, for thousands of years.

We are enabled to give the following statistics of the production. It will be noticed that the coal industry is rapidly developing in this country :—

YEARS.	TONS.	YEARS.	TONS.
1867.....	437,625	1875.....	1,709,269
1871.....	829,745	1876.....	1,823,128
1872.....	1,097,864	1877.....	1,600,000
1873.....	1,170,979	1878.....	1,709,269
1874.....	1,369,025		

Metric tons, of 2,204 lbs.

Of the product in 1878, 1,253,951 tons is classed as coal, 421,449 tons Anthracite (84½ to 95½ p. c. of carbon) and 33,869 tons Lignite. The Anthracite is from the Donetz district, in the Department of the Don-Cossacks.

No coal is exported, but the imports reach up to 1,500,000 tons ; the English furnish three-fifths of this quantity, the remainder being from Germany.

## COAL IN AUSTRIA.

In this country coal mining dates back to the year 1550. In 1819, it had amounted to 94,607 tons ; in 1825, to 154,944 tons ; in 1830, to 211,298 tons ; 1835, to 250,782 tons ; in 1840, to 469,212 tons ; in 1845, to 721,707 tons ; after this date the Lignite and Coal is separated and the following table shows the progress of the industry.

YEAR.	COAL.	LIGNITE.	TOTAL.
1850.....	584,068	360,255	944,323
1855.....	1,180,449	920,601	2,101,050
1860.....	1,948,189	1,548,306	3,496,495
1865.....	2,836,884	2,232,419	5,069,303
1870.....	4,295,775	4,000,169	8,355,944
1871.....	4,969,980	5,078,058	10,048,038
1872.....	4,788,455	5,767,612	10,556,067
1873.....	5,171,189	6,732,884	11,904,073
1874.....	5,096,659	7,183,098	12,279,757
1875.....	5,185,234	7,666,812	12,852,046
1876.....	5,564,331	7,798,255	13,362,586
1877.....	5,480,311	8,771,727	14,252,038
1878.....	5,500,000	9,000,000	14,500,000

Upwards of 1,500,000 tons of Prussian coal is received, and 2,750,000 tons of coal is exported, mainly to Germany. Thus, the consumption within the State is 12,000,000 tons.

The above includes Hungary. Tons are 2,204 lbs.



## NOVA SCOTIA.

The Inspector of Mines, EDWIN GILPIN, furnishes the following summary of the coal sales of Nova Scotia, since the beginning of the industry in that province.

YEAR.	TONS.	YEAR.	TONS.
1785—1790.....	14,349	For 1871.....	596,418
1791—1800.....	51,048	For 1872.....	785,914
1801—1810.....	70,452	For 1873.....	881,106
1811—1820.....	91,527	For 1874.....	749,127
1821—1830.....	140,820	For 1875.....	706,795
1831—1840.....	839,981	For 1876.....	634,207
1841—1850.....	1,533,798	For 1877.....	687,065
1851—1860.....	2,998,829	For 1878.....	693,511
1861—1870.....	4,927,339	For 1879.....	688,626
Total to 1871.....	10,069,143		

The duty on the coal imported into the United States from Nova Scotia is seventy-five cents per ton, gold, on the round or coarse coal, and forty cents per ton, on the culm or slack : that is the coal which passes through bars not wider than three-quarters of an inch. About eight per cent. of the coal sold is culm. We give below the duty at various dates :—

1846 to 1862.....	.24 per cent. advalorem.
1862-3-4.....	\$1.00 per ton.
1865.....	1.10 per ton.
1866-1872.....	1.25 per ton.
1872 to date.....	.75 per ton.

Reciprocity Treaty in force from June, 1854, to March, 1866.

Number of tons actually raised during a term of years :—

YEAR.	TONS.	YEAR.	TONS.
1864.....	562,102	1872.....	880,950
1865.....	715,786	1873.....	1,051,467
1866.....	664,998	1874.....	872,720
1867.....	517,525	1875.....	781,165
1868.....	462,188	1876.....	709,646
1869.....	578,062	1877.....	757,496
1870.....	625,769	1878.....	770,603
1871.....	673,242	1879.....	788,271

The colliery consumption last year, was 85,923 tons, and the stock on hand at the end of the year, 34,029 tons.

The destination of the coal sold during the year 1879, together with a comparison of the "markets" is shown below.

MARKETS.	1879—Tons.	1878—Tons.	1877—Tons.	1876—Tons.	1875—Tons.
Nova Scotia.....	278,120	279,172	255,790	225,658	212,630
Quebec.....	154,118	83,710	95,118	117,303	189,754
New Brunswick.....	84,731	115,245	104,818	101,890	85,968
Newfoundland.....	57,651	61,361	49,342	51,742	62,348
P. E. Island.....	44,891	43,412	45,169	46,908	43,641
United States.....	51,641	88,495	118,216	71,634	88,746
West Indies.....	10,124	16,999	13,660	17,971	16,429
South America.....	523	573	.....	.....	4,779
East Indies.....	.....	.....	.....	.....	1,003
Europe.....	7,348	3,594	4,379	1,101	497
Total.....	688,624	693,511	687,065	634,207	706,795

The Albion mines made 8,316 tons of coke during 1879. The duty levied by the Canadian Government of fifty cents per ton on American coal, has had the effect of diverting trade to the amount of 70,000 tons from the American to the Provincial coals, the sales being made in Ontario and Quebec.

## COAL IN JAPAN.

From its location, this country may play an important part in the coal trade of the world. There are some seventy-nine seams, but only ten are more than three feet thick, and at the same time of good quality; nine others of more than three feet in thickness, of poorer quality, may prove workable if it should only require care in mining to separate much of their slaty matter. Besides these, there are ten beds of coal between two and three feet thick, which may be considered of workable character within the long period of time it will take to exhaust even the better beds. The production in 1874, was stated at 396,240 metric tons; and for 1875, 436,826 tons. We make an estimate of 600,000 tons as for 1879. Skilled artisans and machinery have been taken from France to Japan to erect and work a factory for the manufacture of fuel out of coal dust. There is a completely organized geological survey, under Mr. B. S. Lyman, who has estimated that the coal fields of Western Japan contain 620 million tons of coal, or 400 millions that could be extracted. He places the value at one thousand million dollars.

## COAL IN CHINA.

China is in possession of coal deposits which are a surprise to the Europeans. Coal was worked 2,200 years ago, at least. The Anthracite basin of Southern Shan-se is so rich that an output of three hundred millions per annum, would be available for 2,400 years. The annual product is now set down at three million metric tons, of which one million is Anthracite.

Further discoveries of Anthracite coal are reported, in this country. The coal is stated by the Shanghai Courier to be the same as the best American Anthracite that is brought to China. The supply would appear to be of great extent, and the new coal has shown itself superior to all other known varieties for smelting purposes.

## THE COAL PRODUCTION OF THE WORLD.

We have tabulated the following schedule, from the best sources, and the figures may be taken as essentially correct:

Countries.	Square miles of Coal Area.	Tons—1870.	Tons—1877.	Tons—1878.
Great Britain.....	11,900	110,431,192	134,610,763	132,607,866
United States.....	192,000	32,863,690	54,308,250	*49,130,584
Germany.....	1,770	34,003,004	48,296,367	50,400,925
France.....	2,086	13,179,708	16,889,201	17,096,500
Belgium.....	510	13,697,118	13,938,523	14,899,175
Austria.....	1,800	8,355,944	14,252,038	14,500,000
Russia.....	30,000	829,745	1,600,000	1,709,269
Spain.....	3,501	661,927	699,500	765,000
Nova Scotia.....	18,000	625,769	757,496	788,000
Australia.....	24,840	868,564	1,444,171	1,575,926
India.....	2,004	500,000	4,000,000	4,000,000
Japan.....	5,000	.....	500,000	600,000
Vancouver's Island.....	390	29,863	190,640	228,974
Chili, 50,000, Sweden, 90,000, Italy, 220,000, China, 4,000,000.....				4,360,000

\* For the year 1879—59,808,398.

## STATISTICS OF BITUMINOUS AND SEMI-BITUMINOUS COAL PRODUCTION OF PENNSYLVANIA, IN 1879.

IN TONS OF 2,000 lbs.	
Blossburg.....	874,010
Barclay.....	382,554
McIntyre.....	127,632
Total Northern Pennsylvania region.....	1,384,196
Broad Top.....	149,143
East Broad Top.....	109,696
Snow Shoe.....	56,634
Clearfield.....	1,631,120
Total Central Pennsylvania region.....	1,937,693
Allegheny Mountain.....	213,636
West Pennsylvania Railroad.....	217,156
Southwest Pennsylvania Railroad.....	43,805
Westmoreland.....	816,302
Pittsburgh.....	568,309
Johnstown Iron Works.....	350,000
Add for coke (1,460,687 tons) as coal.....	2,337,100
Total West Pennsylvania region on Penna. R. R.....	4,546,298
Total of above.....	7,863,037

In addition to this, Somerset county, McKean county and the western counties of the State, sufficient to make the sum total 14,500,000 tons, including coal for coking

## COAL TRADE OF THE PENNSYLVANIA RAILROAD.

DISTRICT.	YEAR, 1878.	YEAR, 1879.
East Broad Top.....	63,068	66,376
Huntingdon and Broad Top.....	76,826	144,227
Snow Shoe.....	29,168	56,634
Tyrone and Clearfield.....	1,270,612	1,615,884
Gallitzin and Mountain region.....	200,099	213,636
" " " coke.....	.....	50,465
West Pennsylvania Railroad.....	186,308	217,156
" " Coke.....	80,994	96,157
Southwest Pennsylvania Railroad.....	25,663	43,805
" " Coke.....	786,805	921,860
Westmoreland region.....	692,586	816,302
" " Coke.....	78,766	96,540
Pittsburgh region.....	429,438	568,309
" " Coke.....	128,918	295,665

In addition to this, the Cumberland coal first carried by the H. & B. T. road 187,488 tons, and upwards of a million tons of Anthracite. These details are from the regular report of coal and coke forwarded.

## AMERICAN RAILROAD BUILDING—1879.

The mileage constructed during the year 1879, was larger than for any year since 1872, and there is every indication that the current year will show an equal mileage. The section of country in which the largest mileage is, of course, the Northwest (Illinois, Wisconsin, Minnesota, Iowa, Missouri, Kansas, Nebraska and Dakota) which is credited with 2,181 miles in 1879. We collate these facts from the 'Railroad Gazette,' and append a comparative table of miles completed in the years named.

1872.....	7,340	1876.....	2,460
1873.....	3,883	1877.....	2,315
1874.....	2,025	1878.....	2,916
1875.....	1,561	1879.....	4,430

## THE AMERICAN IRON TRADE.

We make the following extracts from the annual report of the Secretary of the American Iron and Steel Association :—

PRODUCTS, in tons of 2,000 lbs.	1876.	1877.	1878.
Pig iron.....	2,093,236	2,314,535	2,577,361
All rolled iron, including nails and iron rails.....	1,509,269	1,476,759	1,555,576
All rolled iron, including nails and excluding rails.....	1,042,101	1,144,219	1,232,686
Bessemer steel rails.....	412,461	432,169	550,393
Iron and all other rails.....	467,169	332,540	322,890
Street rails, included in iron rails.....	13,086	7,615	9,229
Rails of all kinds.....	879,629	764,709	882,685
Kegs of cut nails and spikes, included in all rolled iron..	4,157,814	4,828,918	4,396,130
Crucible cast steel.....	39,382	40,430	42,906
Open-hearth steel.....	21,490	25,031	36,126
All other steel, except Bessemer.....	10,306	11,924	8,556
Bessemer steel ingots.....	525,996	560,587	732,226
Blooms from ore and pig iron.....	44,628	47,300	50,045

## THE LEGAL TON AND BUSHEL IN PENNSYLVANIA

The Legislature of Pennsylvania have enacted, in reference to what constitutes a bushel or a ton of Bituminous coal.

SECTION 1. That from and after the passage of this act, the standing weight of Bituminous coal in this Commonwealth, shall be seventy-six pounds to the bushel, and two thousand pounds shall be one ton.

SECTION 2. If any person or persons engaged in the business of mining Bituminous coal, shall fix or establish any other number of pounds by agreement or contract to be a bushel of Bituminous coal, than is provided for in the first section of this act, such person or persons shall be guilty of misdemeanor; and upon conviction thereof, shall be sentenced to pay a fine not less than five hundred, and not exceeding one thousand dollars, and all penalties recovered under this act shall be paid into the treasury of the State.



### PRODUCTION OF LEHIGH COLLIERIES-1879.

The following statement shows the number of tons produced at the several collieries in the Lehigh district of the Anthracite coal regions of Pennsylvania. The entire tonnage of the district during 1879, was 3,848,598 16 tons as compared with 2,737,581 12 tons during 1878, an increase of 1,111,017 04 tons or almost forty per cent. Neither of the other districts can make as favorable a showing of their trade for the past year, and the progressive steps which the local operators generally are taking indicate an even more gratifying outcome for the current year's business.

COLLIERY.	TONS.	COLLIERY.	TONS.
Upper Lehigh Coal Co., No. 2.....	169,249	Harleigh, No. 1.....	34,245
Upper Lehigh Coal Co., No. 4.....	162,150	West Cross Creek.....	2,405
Sandy Run Colliery, No. 1.....	88,791	East Sugar Loaf, No. 2, 5 & 6.....	226,908
Highland Colliery, No. 1.....	100,937	South Sugar Loaf and Sugar Loaf.....	52,253
Highland Colliery, No. 2.....	83,791	Laurel Hill and Hazelton.....	207,765
Cross Creek Colliery, No. 1.....	221,652	Crystal Ridge and Cranberry.....	112,654
Cross Creek Colliery, No. 2.....	151,312	Mt. Pleasant Colliery.....	69,920
Cross Creek Colliery, No. 3.....	5,455	Humboldt Colliery.....	50,000
Lattimer Colliery, No. 1.....	131,139	Coleraine Collieries, No. 1.....	115,900
Lattimer Colliery, No. 2.....	84,210	Coleraine Collieries, No. 2.....	24,328
Milnesville Colliery, No. 6.....	74,714	Spring Mountain Collieries, No. 1.....	73,094
Milnesville Colliery, No. 7.....	12,142	Spring Mountain Collieries, No. 5.....	109,640
Hollywood Colliery.....	80,813	Beaver Brook, No. 2.....	77,000
Buck Mountain Coal Co., No. 1.....	149,024	Spring Brook Collieries, No. 5 & 6.....	145,244
Council Ridge, No. 2.....	116,947	Tresckow, No. 6.....	109,137
Council Ridge, No. 5.....	28,095	Room Run, No. 3.....	99,123
Jeddo, No. 1.....	108,729	Panther Creek, No. 5.....	22,224
Jeddo, No. 2.....	91,229	Panther Creek, No. 6.....	108,007
Ebervale, No. 2.....	113,457	Panther Creek, No. 9.....	151,780
Ebervale, No. 3.....	83,111		

OREGON.—We find the following analysis of Coos Bay and Astoria coals, compared with the Nanaimo and Bellingham Bay. There is a business of 50,000 tons from Coos Bay to San Francisco yearly :

	Astoria coals.	Coos Bay.	Nana- imo.	Belling- ham Bay.
Water.....	2.56	20.00	2.98	8.39
Volatile combustibles.....	46.29	32.69	32.16	33.26
Fixed carbon coke.....	48.49	41.98	46.31	45.69
Ash.....	2.74	5.34	18.55	12.66

TENNESSEE.—We credit this State with 450,000 tons of coal, including that made into coke, as the output for the year 1879. The supply was largely in excess of the previous year, and still the supply was short of the demand. There are several mines along Cincinnati road that will be at work this spring, and make a largely increased output. The Bureau of Statistics has no official statement of the coal output of the State.

ANTHRACITE mining and breaking is very wasteful. Professor Sheaffer has estimated that if 20,000,000 tons are marketed annually 30,000,000 are wasted, so that the product is really 50,000,000 tons.

## COAL IN ILLINOIS.

The coal of Illinois is found under a marvelous extent of the territory within the borders of the State, but from the quality of much of it, as compared with the coal produced in any part of the Alleghany coal field, there is not such a quantity produced as otherwise would be the case; the quantity received from neighboring States is as large as the production. The coal found in the Wilmington district is of good quality as will be seen from the analyses appended. The output of the district is nearly three-quarters of a million tons. The results of analyses of this coal are:—

Fixed carbon .....	47.405	47.939
Volatile matter .....	39.642	39.761
Water .....	6.981	7.013
Ash .....	5.972	5.287

There is a large production from the Belleville district in the southwestern part of the State. St. Louis receives its main supply of coal from this district; the business amounts to a million and a quarter tons. We are furnished with the following report on the Wilmington coal output for 1879:

Chicago, Wilmington & Vermillion Coal Co.....	294,217 tons.
Eureka Coal Co.....	158,235 tons.
Star Mining Co., of Coal City .....	80,463 tons.
Wilmington Coal Mining & M'fg Co.....	85,559 tons.
Baird, Hickox & Co.....	44,963 tons.
Bruce Coal Co .....	20,000 tons.

In 1875, 512,800 tons; in 1876, 510,533 tons; in 1877, 289,126 tons (8 mos. lockout); in 1878, 531,629; in 1879, 683,437 tons.

## WYOMING AND UTAH.

We estimate the output of coal in these Territories as 500,000 tons for the year 1879, inasmuch as the Union Pacific Railroad reports a production of 340,000 tons from its own mines at Rock Springs, Alma and Carbon. We append details of U. P. R. R. business.

	Production.	Cost of coal.	Coal sold.	Price realized.
1878.....	275,795 tons.	\$1.04	102,240 tons.	\$6.13
1879.....	340,152 tons.	1.07	125,662 tons.	5.65

The San Pete coal mines in the Southern part of Utah, have attracted attention and are to be developed shortly. The San Pete coal fields are situated on the easterly slope of the Wasatch range of mountains, which is composed chiefly of the shales and sandstones of the cretaceous and tertiary eras, and contain nearly all the coal and lignite beds in the territory. This coal is of a dark brown color, highly inflammable, containing less than 2 per cent. moisture and yielding over 50 per cent. coke, exclusive of ash, which at the present depth ranges from 5 per cent to 8 per cent., and about 40 per cent. bitumen; it might be termed a bituminous lignite, and is essentially different in its composition from the coals of the Rocky Mountains in general. The following analyses have been recorded of the San Pete coal and coke.

CONSTITUENTS.	COAL.	COKE.
Volatile matter.....	40.61	2.70
Fixed Carbon.....	48.21	94.05
Ash.....	1.88	3.25

## COAL TRADE OF OHIO.

The coals of Ohio are all of the Bituminous variety, and are known by various and general names, as block coal, gas coal, cannel coal, etc., and by many special names, as Mahoning Valley coal, Hocking Valley coal, Salinesville coal, etc., according to the localities from which they are drawn. The best furnace coal is the block coal of the Mahoning Valley; the best coke is made from the coals at Leetonia and Washingtonville, in Columbia county; the best house coal is found in Jackson county; the best gas coal, so far as recent tests would seem to indicate, is the Barnesville coal, of Belmont county.

In the Mahoning Valley, raw coal is used in the blast furnaces in the region, with a little Connellsville coke. In the Hocking Valley, raw coal is also used. In Jackson county, raw coal from two seams, the Jackson shaft coal, and the Wellston coal is used. At Leetonia, coke is used, partly native, and partly Connellsville. At Steubenville, a mixture of coke and coal is used from the same seam—the shaft coal of the county. The Jefferson county coal is one of the most valuable in the State. Gas is made from the coals of the Mahoning Valley, the Hocking Valley, the Steubenville coal, the Ohio river coal at Bellaire and Pomeroy, and the Hanging Rock coal of Ironton.

The Bureau of Labor Statistics reports that the output of coal in Ohio for 1879 was 5,000,000 tons, employing 14,000 persons. The coal from the Mahoning Valley is most favorably known, as the Brier Hill coal is there produced to the extent of 1,250,000 tons annually. This district is only 65 miles from Lake Erie with which there are abundant means of communication by the several railroads leading from Youngstown to the lake ports. Much of this coal arrives thereat, via Cleveland, Ashtabula, Painesville, and is thence distributed to the West and Canada by lake and rail connections. An analysis of this coal gives 34.03 volatile; 60.62 fixed carbon; 2.12 ash; 3.25 moisture. The cannel from Youngstown gave an average of 5.45 cubic feet per pound of coal of 22.9 illuminating power.

The coal tonnage of the Hocking Valley for 1879, was as follows: Shipped by Hocking Valley railroad 1,013,629 tons; by Newark, Straitsville & Shawnee Railroad 101,442 tons; by Hocking canal, 50,043 tons. Furnace consumption estimated at 200,000 tons, and other local consumption 100,000 tons. The official statement is as below:—

Year.	Hocking Valley R. R.	N. S. & S. R. R.	Hocking canal.	Total.
1874.....	549,052	200,417	41,101	790,570
1875.....	681,888	199,118	32,815	913,821
1876.....	762,049	223,476	39,172	1,024,697
1877.....	773,368	249,461	42,155	1,064,984
1878.....	860,293	200,194	47,352	1,107,839
1879.....	1,013,629	101,442	50,043	1,165,114

WEST VIRGINIA.—The coal output of West Virginia may be safely set down at one million and a quarter tons, as the business over the Chesapeake and Ohio road is 400,000 tons; the W. Va. gas coal carried by the Baltimore and Ohio is 250,000 tons; and there are the shipments out of the Kanawha river, the Ohio river mines, together with other local consumption and sales and shipments not reported. See the chapters on Kanawha, Baltimore, and W. Va. gas coal.

## KENTUCKY COAL OUTPUT.

This State is endowed with two distinct coal fields; the output from the western field forms the largest proportion of the sum total. We set the output down as at least one million tons. In the western field the most persistent and uniform coal of the series is D, or No. 9; it is from four to six feet thick, averaging five feet. It is an excellent coal for grate and furnace, and gives a good coke. A lot of slack from this vein, from St. Bernard mines, Earlington, Ky., washed and coked, gave a bright, firm coke, with only one per cent. sulphur. The Louisville and Nashville carries 120,000 tons out of the eastern coal field. There is also a large amount of coal sent out via the Cumberland and Kentucky Rivers, and the Ohio from Boyd and Lawrence counties, beside local use. In all we credit this coal field with 350,000 tons.

Details of the production of the western coal field are given below :—

	TONS 1878.	TONS 1879.
Mines on Evansville, Henderson and Nashville Railroad.....	163,698	157,150
Mines on Paducah and Elizabeth Railroad.....	190,000	217,617
Mines on Green River.....	80,000	82,500
Mines on Ohio River, below Green River.....	84,000	79,600
Mines on Ohio River, above Green River.....	50,000	82,500
Grand total.....	567,698	619,367

## COLORADO, COAL OUTPUT.

This State is growing in importance as a coal producer, quietly but surely. The increasing demand for railroad, manufacturing and domestic purposes will put this State on the record as producing half a million tons during 1880. We note the erection of coking ovens in the El Moro district that will utilize the coal hereabout. Last year 13,000 tons of coke were made that sold for \$585,000, or \$45 per ton, principally used at the smelting furnaces of Leadville. Coal output of 1879 was as below :—

SOUTHERN MINES—Canyon.....	78,000 tons, valued at \$468,000
El Moro.....	21,000 tons, valued at \$105,000
Walsenburgh.....	10,000 tons, valued at \$52,500
Northern mines produced.....	275,000 tons, valued at \$1,100,000
El Moro coke, not included above, 13,000 tons.	

## COAL TRADE OF CONNECTICUT.

The receipts of coal of all kinds in the harbor of New Haven, were, in 1878, 458,700 tons; in 1879, 650,200 tons; increase in 1879, 41.8 per cent. The receipts at Bridgeport were in 1878, 144,580 tons; in 1879, 200,250 tons; increase in 1879, 38.9 per cent. Average increase in tonnage in 1879 for both places, 40.7. Taking the coast of Connecticut, including the rivers, the receipts of coal of all kinds for 1878 were about 850,000 tons; and for 1879, not far from 1,200,000 tons. This coal is not all used in the State, but a large quantity of it is forwarded to various places in Massachusetts, and some to New Hampshire and Vermont.



## LAKE SUPERIOR IRON TRADE.

The *Marquette Mining Journal* gives the following statement, in gross tons, of the aggregate product of the mines and furnaces, for each year since 1856, together with value of the same :

YEARS.	ORE.	Pig.	ORE AND Pig.	VALUE.
1856 and before.....	52,000	.....	52,000	\$ 156,000
1857.....	21,000	.....	21,000	63,000
1858.....	31,035	1,629	32,664	249,202
1859.....	65,679	7,258	72,937	575,529
1860.....	116,908	5,660	122,568	736,496
1861.....	114,258	7,970	122,228	775,832
1862.....	115,721	8,590	124,311	984,977
1863.....	185,257	9,813	195,070	1,416,935
1864.....	235,123	13,620	248,743	1,867,215
1865.....	196,256	12,283	208,539	1,590,430
1866.....	296,972	18,437	315,409	2,405,960
1867.....	466,976	30,211	496,287	3,475,820
1868.....	507,813	33,246	546,059	3,992,413
1869.....	633,238	39,003	672,241	4,968,435
1870.....	856,471	49,298	905,769	6,300,170
1871.....	813,979	51,225	864,604	6,115,895
1872.....	952,055	61,195	1,013,250	9,188,055
1873.....	1,167,379	70,507	1,237,886	11,395,887
1874.....	935,488	86,494	1,021,982	7,592,811
1875.....	910,840	81,753	992,593	5,788,763
1876.....	977,233	61,911	1,039,144	5,397,785
1877.....	960,982	23,635	990,967	4,299,598
1878.....	1,125,093	17,404	1,192,497	6,884,432
1879.....	1,414,182	39,583	1,453,765	7,413,114
Total.....	13,150,439	741,775	13,892,213	\$93,634,754

## THE DIFFERENT QUALITIES OF COAL.

The nomenclature used in the Final Report of the First Pennsylvania Geological Survey, in regard to the proper designation of various qualities of coal, is as follows:—

## ANTHRACITE.

Hard Anthracite, that which contains two per cent. of volatile matter.

Semi, or gaseous Anthracite, that which contains ten per cent. of volatile matter.

## COMMON BITUMINOUS OR COKE COALS.

Semi-Bituminous, that which contains twelve to eighteen per cent. volatile matter.

Bituminous, that which contains eighteen to forty-eight per cent. volatile matter.

## HYDROGENOUS, YIELDING NO COKE.

Cannel coal—

Hydrogenous shaly coal—containing thirty to seventy per cent. volatile matter.

Asphaltic coal—

# PRODUCTION OF ANTHRACITE IN NORTHUMBERLAND COUNTY, PENNSYLVANIA.

Mr. J. J. John has compiled the following statement.

COLLIERIES.	OPERATORS.	Tons 1879.	Tons 1878.
Mt. Carmel Shaft,	P. & R. Coal and Iron Co.....	179,775	121,267
Cameron,	Mineral Railroad and Mining Co.....	160,228	159,700
Big Mountain,	Patterson, Llewellyn & Co.....	147,955	92,837
Henry Clay No. 1,	J. Langdon & Co.....	134,358	96,998
Luke Fidler,	Mineral Railroad and Mining Co.....	114,124	103,299
Monitor,	Geo. W. Johns & Bro.....	109,977	88,210
Enterprise,	Enterprise Coal Co.....	106,159	63,414
Bear Valley,	P. & R. Coal and Iron Co.....	97,454	71,933
Locust Gap,	Graeber & Shepp.....	85,975	63,970
Reliance,	P. & R. Coal and Iron Co.....	83,846	7,374
Trevorton,	P. & R. Coal and Iron Co.....	83,416	39,892
Buck Ridge,	May, Audenried & Co.....	75,078	46,198
Stirling,	Kendrick & Co.....	72,481	54,085
Excelsior,	Excelsior Coal Co.....	67,195	72,310
Locust Spring,	P. & R. Coal and Iron Co.....	60,719	34,592
Burnside,	P. & R. Coal and Iron Co.....	56,169	
Stuartville,	Wm. Montelius.....	54,238	80,442
Ben Franklin,	Douty & Baumgardner.....	49,003	38,576
Peerless,	Cruikshank & Emes.....	22,863	33,788
Pennsylvania,	Mineral Railroad and Mining Co.....	16,960	
Greenback,	H. J. Toudy.....	16,142	7,132
Lancaster,	Smith & Keiser.....	13,961	8,696
Black Diamond,	Wm. Schwenk & Co.....	11,675	21,003
Carson,	Philip Goodwill.....	4,688	1,444
Geo. Fales,	P. & R. Coal and Iron Co.....	3,946	2,464
Franklin,	C. M. Vought 748.18—A. A. Heim 130.18.....	879	3,444
Packer,	D. J. Lewis.....	370	5,716
Hickory Ridge,	Mineral Railroad and Mining Co.....		21,472
Marshall,	George Raup.....		10
Henry Clay,	J. Langdon & Co.....		3,975
		1,829,645	1,344,254

## DIVISION OF TONNAGE—1879.

Shipped by Individual Operators.....	973,002 14
Shipped by Philadelphia and Reading Coal and Iron Company.....	565,329 11
Shipped by Mineral Railroad and Mining Company.....	291,313 04
Total.....	1,829,645 09
Forwarded by Philadelphia and Reading Railroad.....	931,785 11 tons.
Forwarded by Lehigh Valley Railroad.....	41,413 08 tons.
Forwarded by Northern Central Railroad.....	856,446 10 tons.
Estimated sales at mines.....	18,000 00 tons.
Estimated consumption at breakers.....	90,000 00 tons.

Grand total output for 1879.....1,937,645 09 tons.

## THE CARRYING TRADE OF THE WORLD.

A new edition of the "Repertoire Generale de Bureau Veritas for 1879-80" shows that in the past year the sailing tonnage of the world decreased from 14,218,072 to 14,103,605 tons, showing a progressive substitution of steamers for sailing vessels. The total sailing tonnage of Great Britain, including colonial vessels, is 5,584,128 tons, or considerably more than one-third of the whole sailing tonnage of the world. In steamships Great Britain takes a still larger proportion. The total number is 5,897, of which Great Britain has 3,542; and the total net tonnage of steamships is 4,021,869 tons, of which Great Britain has 2,555,575 tons, or about three-fifths of the whole. Counting sailing vessels and steamships together, the civilized world has 18,125,474 tons afloat, of which 8,139,703 tons, or nearly one-half, are under the British flag. Canada occupies the fourth position. The leading nations are Great Britain, the United States, Norway, Canada, Germany, Italy and France.

## MINERS OUTPUT OF COAL.

In other portions of this work we give statements of the production per miner per year in the American Anthracite and Bituminous mines. The average annual output in the several districts in Great Britain is stated below:—

North Staffordshire.....	237 tons.	West Scotland.....	312 tons.
Northumberland and North Durham.....	268 tons.	Monmouth, &c.....	318 tons.
Yorkshire and Lincolnshire.....	270 tons.	West Lancashire.....	322 tons.
Derby, &c.....	275 tons.	East Scotland.....	326 tons.
South Wales.....	281 tons.	South Durham.....	356 tons.
North Lancashire.....	293 tons.	South Staffordshire.....	373 tons.

## SEATTLE, W. T. COAL TRADE.

In our summary of the output of coal in the Union, we credit Washington Territory with 175,000 tons, of this something like 130,000 tons is shipped from Seattle to San Francisco. We append details of the shipments.

1871.....	4,918 tons.	1876.....	112,734 tons.
1872.....	14,830 tons.	1877.....	104,556 tons.
1873.....	13,572 tons.	1878.....	128,582 tons.
1874.....	9,027 tons.	1879.....	132,264 tons.
1875.....	70,157 tons.		

CALIFORNIA.—The coals of California are of a Lignitic character. The production of the mines is set down as 600,000 tons a year. The Mount Diablo coal is sold largely in San Francisco, and we have the following record of the receipts at that point.

1861.....	6,620 tons.	1871.....	133,485 tons.
1862.....	23,400 tons.	1872.....	177,232 tons.
1863.....	43,200 tons.	1873.....	171,741 tons.
1864.....	50,700 tons.	1874.....	206,255 tons.
1865.....	60,530 tons.	1875.....	142,808 tons.
1866.....	84,920 tons.	1876.....	108,078 tons.
1867.....	109,490 tons.	1877.....	96,172 tons.
1868.....	132,537 tons.	1878.....	122,034 tons.
1869.....	148,722 tons.	1879.....	134,435 tons.
1870.....	129,761 tons.		

## IMPROVED COLLIERY WINDING GEAR.

Koepe's patent winding gear has been adopted at many collieries in Germany and France, and has been introduced in England. The principal feature in the new system consists in doing away with the ordinary drum, and the great weight of rope, which in deep mines is a very great strain upon the engine. In this system the cages are attached, one to each end of the winding rope which passes over the head-gear pulleys and over a winding pulley, which takes the place of the drum, and a balance rope of the same weight as the winding rope is fixed to the bottom of each of the cages, the balance rope hanging freely in the shaft and the lower end being allowed to dip into the sump at the bottom. By this method, however deep the shaft, the ropes and cages are always balanced, and the engine in winding up has only to overcome the weight of the coal in the tubs and the friction of the working parts, a steady engine speed is secured, while considerably less engine power is required, and the risk of overwinding is very much reduced.

## COAL TRADE OF THE UNION.

We give below the tonnage for the year 1869, as per census reports made in 1870, together with official figures for the year 1879, where available; in other cases, we have made a careful estimate based upon our reports of the trade in the various States:—

	1869—tons.	1879—tons.
Pennsylvania Anthracite.....	13,866,180	26,142,689
Pennsylvania Bituminous.....	7,798,517	14,500,000
Illinois.....	2,629,563	3,500,000
Ohio.....	2,527,285	5,000,000
Maryland.....	1,819,824	1,730,709
Missouri.....	621,930	900,000
West Virginia.....	603,878	1,250,000
Indiana.....	437,870	1,000,000
Iowa.....	263,487	1,600,000
Kentucky.....	150,582	1,000,000
Tennessee.....	133,418	450,000
Virginia.....	61,803	90,000
Kansas.....	32,938	400,000
Oregon.....	.....	200,000
Michigan.....	21,150	35,000
California.....	.....	600,000
Rhode Island.....	14,000	15,000
Alabama.....	11,000	250,000
Nebraska.....	1,425	75,000
Wyoming.....	50,000	175,000
Washington.....	17,844	170,000
Utah.....	5,800	225,000
Colorado.....	4,500	400,000
Georgia.....	.....	100,000
Total.....	31,116,595	59,808,398

LARGEST OUTPUT OF ANTHRACITE at a single colliery is at the West Brookside colliery, of the Philadelphia & Reading Coal and Iron Company. The output was 402,208 tons last year, or nearly one-sixtieth of the entire output.



RHODES & Co., shipped at Cleveland, 50,126 tons; at Black River, 68,020 tons; at Ashtabula, 63,830 tons during the year 1879.

LOUISVILLE, KY.—This city consumes something like 650,000 tons of coal and coke annually, mainly Pittsburgh.

PERCENTAGES OF ANTHRACITE.—On page 12, we give facts upon this subject. We have the Delaware & Hudson Company's for 1879: 8.16 per cent. of Lump; 2.97 of Steamer; 16.11 of Grate; 14.06 of Egg; 30.64 of Stove; 20.32 of Chestnut; 7.47 of Pea, and 0.25 of Dust. This year at least twenty per cent. will be added to the sizes above Egg, and the others below that size reduced.

WEST BRANCH REGION.—The coal from this region is mined on the line of the Philadelphia and Erie Railroad, in Cameron and Elk counties, and finds a market in Buffalo and along the line of the P. & E. and B. N. Y. & P. roads. We have the tonnage of Northwestern Mining Co., for 1879, as 97,204 tons; Enreka, 13,672 tons; Silver Creek, 18,477 tons; Cameron Colliery, 42,000 tons; St. Mary's Coal Co., 87,169 tons; Glen Mayo Colliery, 20,000 tons.—All of 2,000 lbs.

COAL IN THE GEORGES CREEK REGION.—Recent measurements taken at the shaft of the Piedmont Coal Company develop the following depths of the several veins of coal:

The Three-foot vein is 380 feet below the Big Vein.

The Four-foot vein is 180 feet below the Three-foot vein, or 560 feet below the Big Vein.

The Six-foot vein is 165 feet below the Four-foot vein, or 725 feet below the Big Vein.

ALABAMA COAL OUTPUT.—We are without the tonnage for 1879, but it is safe to estimate an increase of 25,000 tons. Business has been:—

On the line of	1874.	1875.	1876.	1877.	1878.
South and North R. R.....	33,139	57,516	76,140	139,182	162,601
Selma and D. R. R.....	14,750	14,890	20,500	22,500	19,167
Alabama Gt. Southern.....	2,000	2,500	5,000	9,000	10,000
Other roads and wagon delivery.....		1,000	1,000	1,500	2,500
Total—tons of 2,000 lbs.....	49,889	75,906	102,640	172,182	194,268

REYNOLDSVILLE COAL DISTRICT.—The coal from this district is mined along the line of the Allegheny Valley Railroad in Jefferson and Clearfield counties, Pa., and is of excellent quality for general steam purposes. Wherever it has had a trial its record has been of such a character as to warrant an increased demand. The business done last year was not so great as might be, owing to labor troubles. It is expected that the tonnage of 1880 will show an increase. The vein of coal opened in this immediate region is designated as the lower Freeport bed, and varies in thickness from five to eight feet, while that of the upper Freeport bed is opened in but few places near the centre of the basin, showing a thickness of about five feet. These two veins are included in the middle measures, and are above water level. The analyses made by the Survey show the coal to be of even character, and we take as an average: 32.90 volatile; 62.194 fixed carbon; 3.10 ash; 1.10 moisture; sulphur .726. We have the official statement that the coal moved from Du Bois was 205,226 *net* tons, and from Reynoldsville 108,188 *net* tons, during the year 1879. The coal is sold quite extensively in Buffalo for distribution, much of it going into Canada.

# THE COAL TRADE,

A Compendium of Valuable Information

RELATIVE TO

Coal Production, Prices, Transportation, Etc, Etc.

AT HOME AND ABROAD,

WITH

Many Facts Worthy of Preservation for Future Reference.

CORRECTED TO THE LATEST DATES.

BY

FREDERICK E. SAWARD,

Editor of "THE COAL TRADE JOURNAL."

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1881.

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EIGHTH CONSECUTIVE YEAR OF PUBLICATION.

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# THE COAL TRADE.

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## INTRODUCTION

We present herewith the eighth Annual Review of the Coal Trade, at home and abroad. Many new features will commend themselves to the attention of the reader. With the condition of the whole country so prosperous as it was during the year just ended, it is not surprising to find an increase in the output of coal in the United States. Anthracite was not so largely produced, but the price was far better, than during the preceding year. Bituminous coal output was largely increased in all the States, and the prices were good. Coke was more largely used, and the outlook for this fuel is very bright. It will be seen upon reference to the proper tabular statement that we make the output of the United States, last year, upward of sixty-six millions of tons; this keeps us in the place maintained for several years past—second in the list of coal producing countries.

We have made most valuable additions to the statistical matter relating to the home production, and there is no reduction in the amount of information regarding the trade in other countries than our own. The yearly editions of this work contain information that should be known to all who traffic in or consume coal. One year's edition differs from another, in that each is entirely new, and therefore the preceding editions should be consulted. We return our thanks for the many courtesies extended by parties who have contributed statistics to make the work so complete, and trust others who may have facts and figures to communicate will make themselves known. In the comparative business that is done by countries, states, districts or individuals, there is much to interest the reader.

## ANTHRACITE COAL.

We present in their proper order the facts and figures connected with the course of the Anthracite coal trade during the year past. All the necessary details of production, distribution, price, etc., will be found presented in concise form. The business was managed last year so as to yield a profit to the producer and carrier, and there is no reason why the tonnage for 1881, cannot be very nearly thirty millions of tons, and all of it marketed at a rate that will yield a handsome return upon the capital invested. The grand total of coal shipped from the mines to market last year, was 23,437,242 tons; to obtain the consumption may be added at least 3,500,000 tons of the output of 1879, that was carried over, thus making the consumption of this description of fuel, larger in amount than had ever been previously recorded. Prices ranged fully \$1.50 per ton higher at tide-water than during 1879, and were kept steady at this higher range throughout the year. To do this however, it was necessary at times to resort to stoppages of production and shipment. Confidence, as between seller and consumer, has once more been restored, and there is no necessity for a return to the ruinous policy of competition that was the rule during 1878-79.

The quantity of this quality of fuel brought through to tide-water for consumption at points east of the Hudson and Delaware rivers, is less than forty per cent., inasmuch as the receipts, so classed, during 1880, amounted to 10,088,159 tons out of the sum total. Of the decreased output of 2,705,447 tons, as compared with 1879, there was 1,735,561 tons less received at tide-water. Of the features that will add so much to the revenue of the Anthracite operators, none is more worthy of attention than the growth of the trade now being done to points beyond the State of Pennsylvania, in a westwardly direction. This business has now grown to considerable proportions, and we are rapidly approaching the time, when the quantity that will be wanted for consumption in this direction, will govern the price to be asked for the entire output. This coal is the most widely known and used, of any of the coals that are produced within the borders of the United States. Wherever it is once used for domestic fuel, it continues to be in request, at even a very large advance over the price asked for the Bituminous and semi-Bituminous coals of the immediate vicinity. It does not soil the hands, and from its cleanliness, the absence of smoke, soot and dirt, it is perfection as a house fuel.

The question as to the available supply of Anthracite is an interesting one; the estimated quantity in the several coal fields, and the relative amount of waste and quantity mined, is stated by Professor P. W. Sheaffer, upon data collected to the beginning of 1880, to be as given herewith:—

*Southern or Schuylkill coal field;* average thickness of coal seams 25 yards; mined thus far 145,594,825 tons, and wasted 291,187,650 tons. Probable yield to come, 3,768,746,666 tons coal; waste double this quantity.

*Middle coal field;* average thickness of coal seams 15 yards; mined thus far 69,977,677 tons, and wasted 137,955,334 tons. Probable yield to come 1,451,488,000 tons coal; waste double this quantity.

*Northern or Wyoming coal field;* average thickness of coal seams, 15 yards; mined thus far 143,527,944 tons, and wasted 287,055,888 tons. Probable yield to come 3,066,624,000 tons coal; waste double this quantity.

## THE PRODUCTION OF ANTHRACITE COAL.

The shipment of Anthracite as reported by J. H. Jones, accountant of the Anthracite coal statistics, was as stated below. Coal used in and about the mines not included in these statements; the amount will average eight per cent., of the shipments.

<i>Year.</i>	<i>Schuylkill.</i>	<i>Lehigh.</i>	<i>Wyoming.</i>	<i>Total.</i>
1861.....	3,160,747	1,738,377	3,055,140	7,954,264
1862.....	3,372,583	1,351,054	3,145,770	7,869,407
1863.....	3,911,683	1,894,713	3,759,610	9,566,006
1864.....	4,161,970	2,054,669	3,960,836	10,177,475
1865.....	4,356,959	2,040,913	3,254,519	9,652,391
1866.....	5,787,902	2,179,364	4,736,616	12,703,882
1867.....	5,161,671	2,502,054	5,325,000	12,988,725
1868.....	5,330,737	2,502,582	5,988,146	13,801,465
1869.....	5,775,138	1,949,673	6,141,369	13,866,180
1870.....	4,968,157	3,239,374	7,974,660	16,182,191
1871.....	6,552,772	2,235,707	6,911,242	15,699,721
1872.....	6,694,890	3,873,339	9,101,549	19,669,778
1873.....	7,212,601	3,705,596	10,309,755	21,227,952
1874.....	6,866,877	2,773,836	9,504,408	20,145,121
1875.....	6,281,712	2,834,605	10,596,155	19,712,472
1876.....	6,221,934	3,854,919	8,424,158	18,501,011
1877.....	8,195,042	4,332,760	8,300,377	20,828,179
1878.....	6,282,226	3,237,449	8,085,587	17,605,262
1879.....	8,960,329	4,595,567	12,586,293	26,142,689
1880.....	7,554,742	4,463,221	11,419,279	23,437,242

## DIVISION OF SHIPMENTS 1879-1880.

<i>Interest.</i>	<i>Tons 1879.</i>	<i>Tons 1880.</i>
Philadelphia and Reading Railroad.....	7,442,617	5,933,923
Lehigh Valley Railroad.....	4,405,957	4,894,638
Central Railroad of New Jersey.....	3,825,553	3,470,141
Delaware, Lackawanna and Western Railroad.....	3,867,407	3,550,348
Delaware and Hudson Canal Company.....	3,054,390	2,712,910
Pennsylvania Railroad Company.....	1,682,108	1,864,032
Pennsylvania Coal Company.....	1,427,150	1,138,466
New York, Lake Erie and Western Railroad.....	437,509	372,889
Totals.....	26,142,689	23,437,242

The Pennsylvania Railroad interest, includes Shamokin coal, Lykens Valley coal, and some Wyoming coal. Reading is of the various grades of Schuylkill. Lehigh Valley is three-fourth Lehigh, and balance Wyoming. Central Railroad of New Jersey is about equally divided between Lehigh and Wyoming. Delaware and Hudson; Delaware, Lackawanna and Western Railroad; Pennsylvania Coal Company, all from Wyoming region. 'Erie' coal is from Wyoming. In addition to this may be put 65,000 tons of Loyalsock Anthracite from Sullivan county. Details of the business of the various companies will be found in the following pages.



## THE PHILADELPHIA AND READING RAILROAD COMPANY.

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1860.....	1,946,195	1870.....	4,633,504
1861.....	1,639,535	1871.....	6,002,573
1862.....	2,310,990	1872.....	6,185,434
1863.....	3,065,261	1873.....	6,546,555
1864.....	3,065,577	1874.....	6,348,812
1865.....	3,090,814	1875.....	5,505,455
1866.....	3,714,684	1876.....	5,595,207
1867.....	3,446,826	1877.....	7,255,818
1868.....	4,574,874	1878.....	5,909,140
1869.....	4,239,457	1879.....	8,147,579

The total coal tonnage carried by the company is shown in the schedules above ; the amount of coal produced by the Philadelphia and Reading Coal and Iron Company will not average three millions tons per annum. The coal produced from the lands owned by the company during the years 1873-80, is shown below, together with the reported average cost of coal in cars at the mines.

<i>Leases. produced.</i>	<i>P. &amp; R. C. &amp; I Co. produced.</i>	<i>Average cost at mines.</i>
1873.....2,055,565 tons.	1,348,838 tons.	\$2.51 per ton.
1874.....1,802,370 tons.	1,374,790 tons.	2.45 per ton.
1875.....1,594,741 tons.	1,510,572 tons.	1.87 per ton.
1876.....1,218,533 tons.	1,853,364 tons.	1.35 per ton.
1877.....1,389,103 tons.	3,794,528 tons.	1.04 per ton.
1878.....1,100,181 tons.	2,727,608 tons.	1.24 per ton.
1879.....1,300,322 tons.	4,269,929 tons.	1.14 per ton.

Of the disposition made of the total coal *carried* during the fiscal year ending in 1880, (7,179,398 tons,) we make the following record:

Passing over Main Line and Lebanon Valley Branch.....	4,307,126 tons.
For shipment by Schuylkill Canal.....	484,731 tons.
Shipped West'd via Cat. & Wpt. Br. & N. C. R. R.....	454,982 tons.
Shipped East via Lehigh Valley Railroad.....	138,305 tons.
Shipped West and South from Pine Grove.....	97,140 tons.
Consumed on Laterals.....	35,721 tons.
Lehigh and Wyoming coal.....	764,721 tons.
Bituminous.....	278,236 tons.
Coal for company's use.....	504,004 tons.

Philadelphia takes over a million tons of Schuylkill coal, carried by this company; there is a shipping business of two million tons at Port Richmond, and the 'line' deliveries aggregate nearly two millions of tons. This company also sends coal through to the tide-water shipping ports of South Amboy and Elizabethport, N. J. The coal tonnage originating with this railroad company, is stated to have been 5,933,922 tons during the calendar year 1880, thus making it the largest Anthracite coal carrier, as its Coal and Iron Company, is the largest producer.

The ton named is of 2,240 lbs., and the year in all tabular statements ends with November 30th.

Prices during 1880, were very steady for the domestic sizes. In January and December the price-lists were as below for hard white ash coal at Port Richmond.

	<i>Lump.</i>	<i>Broken.</i>	<i>Egg.</i>	<i>Stove.</i>	<i>Chestnut.</i>
January.....	\$3.90	\$3.60	\$3.60	\$4.00	\$3.50
December.....	4.65	4.05	4.10	4.10	3.65

At Elizabethport, for the same quality.

	<i>Lump.</i>	<i>Broken.</i>	<i>Egg.</i>	<i>Stove.</i>	<i>Chestnut.</i>
January.....	\$4.25	\$3.95	\$3.95	\$4.25	\$3.75
December.....	5.00	4.40	4.45	4.45	4.00

The rate of tolls from Schuylkill Haven, to Port Richmond, was \$1.40 per ton, and to Elizabethport \$2.50 per ton. Prices of Hard White Ash coal, at Schuylkill Haven for the line trade closed at \$3 per ton, for all sizes except Chestnut, and that was \$2.75. Tolls to Philadelphia \$1.95 per ton.

### THE LEHIGH VALLEY RAILROAD COMPANY.

<i>Year.</i>	<i>East of Mauch Chunk.</i>	<i>Total Coal Tonnage.</i>
1871.....	2,210,272	2,889,074
1872.....	3,009,395	3,850,118
1873.....	3,189,023	4,144,339
1874.....	3,016,636	4,150,659
1875.....	2,417,800	3,277,571
1876.....	3,129,895	3,951,513
1877.....	3,453,533	4,362,124
1878.....	2,758,756	3,446,615
1879.....	3,531,829	4,361,785
1880.....	3,774,729	4,606,415

<i>Received from.</i>	<i>Tons, 1878.</i>	<i>Tons, 1879.</i>	<i>Tons, 1880.</i>
Wyoming region.....	919,712	1,135,587	1,162,706
Hazleton region.....	1,520,049	1,964,278	2,125,104
Beaver Meadow region.....	435,951	474,761	441,591
Mahanoy region.....	565,826	786,082	876,860
Miscellaneous.....	5,076	1,076	243
Totals.....	3,446,615	4,361,785	4,606,415

The quantity of coal forwarded east of Mauch Chunk, was as stated above, 3,774,729 tons; of this 1,408,422 tons was delivered to the New Jersey division for delivery at Perth Amboy, and for the line trade in New Jersey.

The rate of transportation from Mauch Chunk to Perth Amboy, 101 miles, is \$1.40 per ton. Laterals to Mauch Chunk average fifty cents per ton.

Prices of coal at Mauch Chunk, for delivery 'on the line,' were \$3.25 per ton for all sizes, down to Chestnut, at the beginning of 1881.

NOTE.—All above figures are for fiscal years, which end with November, and tons are 2,240 lbs. in all cases.

## PENNSYLVANIA AND NEW YORK RAILROAD.

This line is an important feeder to the Lehigh Valley Railroad, for its business to the north and west. In addition thereto, it transports a large amount of Bituminous coal from what is known as the "Barclay" region. The Loyalsock coal mined in Sullivan county, Pa., is shipped from the mines over the State Line & Sullivan Railroad, and thence to market via this line and its northern connections.

Anthracite.....	In 1878—780,796 tons.	In 1879—860,161 tons.	In 1880—705,464 tons.
Bituminous.....	In 1878—314,567 tons.	In 1879—329,901 tons.	In 1880—435,516 tons.

## PENNSYLVANIA COAL COMPANY.

Year.	Tons.	Year.	Tons.
1871.....	802,039	1876.....	1,086,475
1872.....	1,213,478	1877.....	1,118,011
1873.....	1,239,214	1878.....	957,022
1874.....	1,338,663	1879.....	1,427,150
1875.....	1,368,207	1880.....	1,138,466

There was sent east via the 'Erie' railway, 986,023 tons during 1880, destined for Newburgh, and 131,829 tons west, via 'Erie.' This company sells its coal through contractors, or middle men, and realizes on the general result, as good prices as any of the other companies. In January and December, 1880, the figures were:—

	Lump.	Broken	Egg.	Stove.	Chestnut.
January.....	\$3.20	\$3.10	\$3.10	\$3.50	\$3.50
December.....	3.95	3.95	3.95	4.30	3.85

## DELAWARE AND HUDSON CANAL COMPANY.

Year.	Tons.	Year.	Tons.
1871.....	1,366,474	1876.....	1,997,545
1872.....	2,930,761	1877.....	1,929,248
1873.....	2,752,595	1878.....	2,144,120
1874.....	2,399,417	1879.....	3,054,390
1875.....	3,053,817	1880.....	2,712,910

The distribution has been as below:—

	Tons, 1879.	Tons, 1880.
Amount mined.....	3,054,390	2,712,910
Shipped South.....	66,172	59,399
To Oswego via D. L. & W.....	181,156	92,314
West via Erie Railway.....	464,248	388,262
North via Albany and Susquehanna.....	361,748	402,785
To Honesdale for sale and shipment.....	2,021,294	1,731,944

*There was forwarded from Honesdale.*

By Canal.....	1,076,193	993,146
By Rail.....	799,735	538,804

This company owns and operates a canal from Honesdale, Pa., to Rondout, N. Y., 108 miles, and has also leased lines of railroad north and east, thus giving an opportunity for the shipment of Anthracite to the interior, where the prices obtained are more profitable than at tide-water. They have also been large shippers to the west, via the 'Erie' railway. Prices at tide-water did not vary much throughout the year; the opening and closing prices were:—

	Lump.	Broken.	Egg.	Stove.	Chestnut.
January.....	\$3.00	\$3.00	\$3.05	\$3.60	\$3.45
December.....	4.00	4.00	4.20	4.45	4.10

THE DELAWARE, LACKAWANNA & WESTERN R. R. CO.

Year.	Tons.	Year.	Tons.
1871.....	1,916,486	1876.....	2,300,500
1872.....	2,836,948	1877.....	2,089,523
1873.....	3,136,306	1878.....	2,180,672
1874.....	2,570,437	1879.....	3,867,407
1875.....	3,326,901	1880.....	3,550,348

This tonnage includes coal carried, purchased and mined. There are no details of the distribution other than 'North' and 'South.' The tonnage forwarded North includes all the coal sent West and North, and amounted to 1,505,843 tons in 1880; the tonnage forwarded South is the coal brought to Hoboken, and for the line trade in New Jersey, and amounted to 2,033,243 tons in 1880. This company held no auction sales during 1880, but sold their tide-water coal at the same prices as Lackawanna, and Wilkes-Barre coal. The coal transported to tide for individual operators pays toll by a percentage of the selling price of the coal. The company has adopted a very liberal policy in this regard, and this accounts for the increased tonnage. Distance from Scranton, Pa., to Hoboken, N. J., is 147 miles. Prices during 1880, at tide-water were:—

	Lump.	Broken.	Egg.	Stove.	Chestnut.
January.....	\$3.40	\$3.40	\$3.45	\$4.00	\$3.75
December.....	4.00	4.00	4.20	4.45	4.10

CENTRAL RAILROAD OF NEW JERSEY.

Amount of coal carried over the Lehigh & Susquehanna Railroad.

Year.	Tons.	Year.	Tons.
1871.....	1,033,587	1876.....	2,952,520
1872.....	2,527,068	1877.....	2,969,788
1873.....	3,089,697	1878.....	2,390,655
1874.....	2,972,286	1879.....	4,088,954
1875.....	2,661,635	1880.....	3,843,209

The source of receipt of the coal carried during 1880, was as follows, in tons of 2,240 pounds:—

WYOMING REGION,	Lehigh & Wilkes-Barre Coal Company.....	1,505,619.17
	Everhart Coal Company.....	46,202.03
	Susquehanna Coal Company.....	119,537.04
	Delaware and Hudson Canal Company.....	43,099.15
	Red Ash Coal Company.....	63,734.13
UPPER LEHIGH,	Upper Lehigh Coal Company.....	307,032.02
	M. S. Kemmerer & Co.....	117,877.18
	Pond Creek Coal Company.....	23,412.17
BEAVER MEADOW,	Lehigh and Wilkes-Barre Coal Company.....	424,261.05
	Thomas John & Co.....	76,060.10
MAUCH CHUNK,	Lehigh Coal and Navigation Company.....	617,989.08
CROSS CREEK,	Coxe Bros. & Co.....	304,242.16
COUNCIL RIDGE,	J. Leisenring & Co.....	97,700.13
LEHIGH VALLEY R. R. Packerton	.....	8,571.11
R. P. Smith & Co.....	.....	87,866.17

Distribution.	Year, 1880.	Year, 1879.
Forwarded East by Rail to Tidal points.....	2,180,571.12	2,533,403.04
Forwarded East by Rail to Local points.....	922,183.02	832,097.00
Forwarded East by Rail use Central division.....	136,968.02	125,846.08
Forwarded East by Rail use L. & S. division.....	15,471.03	18,657.04
Delivered at and above Mauch Chunk.....	98,653.13	99,140.00
Delivered at Coalport and Hazard for Canal.....	369,729.08	387,038.17
Delivered to Lehigh Valley Railroad, at Packerton.....	95.02	1,901.10
Delivered to Lehigh Valley Railroad, at Sugar Notch.....	119,537.04	90,870.05
Total.....	3,843,209.06	4,088,954.08



## LEHIGH COAL AND NAVIGATION COMPANY.

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1872.....	566,724	1877.....	550,519
1873.....	525,623	1878.....	430,987
1874.....	572,470	1879.....	701,761
1875.....	397,427	1880.....	617,989
1876.....	606,773		

This company dates back to 1820, as a mining and carrying company. The figures in the schedule above, are the figures of the production at the 'Summit mines.'

## LEHIGH AND WILKES-BARRE COAL COMPANY.

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1874.....	2,479,382	1878.....	1,201,406
1875.....	2,085,038	1879.....	2,189,551
1876.....	2,300,555	1880.....	1,929,881
1877.....	2,196,864		

Since 1877, the coal from Summit Hill is not included, these mines being again under the management of the Lehigh Coal and Navigation Company.

## PENNSYLVANIA RAILROAD—BELVIDERE DIVISION.

This line forms an important feeder to the Anthracite roads centering at Phillipsburg, N. J. The sources of supply and distribution are clearly given below:—

From Lehigh region.....	In 1880—959,600 tons.	In 1879—719,415 tons.
From Wyoming region.....	In 1880—222,678 tons.	In 1879—260,451 tons.
	<i>Tons, 1880.</i>	<i>Tons, 1879.</i>
Distributed to Trenton for shipment.....	52,167	35,902
Distributed to South Amboy for shipment.....	560,607	502,367
Distribution to local points for consumption.....	515,608	844,828
Coal for company's use.....	111,535	96,770

## MINERAL RAILROAD AND MINING COMPANY.

The production of Anthracite coal at the mines of this company during the year 1880, is given below; these collieries are in the Shamokin region, and the Pennsylvania Railroad Company, is the land owner.

Cameron, 158,759 tons; Luke Fidler, 117,781 tons; Pennsylvania, 105,454 tons.

## SUMMIT BRANCH RAILROAD COMPANY.

The production of Anthracite coal at the mines of this company in 1880 was 227,436 tons from the Summit Branch colliery, and 165,623 tons from the Short Mountain colliery. The Pennsylvania Railroad Company control this company.

## ERIE RAILWAY—ANTHRACITE TONNAGE.

The tonnage reported below represents the production of mines in which the New York, Lake Erie and Western Railway is interested.

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1871.....	55,596	1876.....	230,709
1872.....	83,288	1877.....	175,095
1873.....	36,728	1878.....	278,132
1874.....	197,582	1879.....	437,509
1875.....	303,039	1880.....	372,889

COAL TRADE OF THE NEW YORK CANALS.

The quantity carried on the State canals, in both directions, East and West, is stated by the Canal Auditor, to be as below :—

QUALITY—TONS, 2000 LBS.	1877.	1878.	1879.	1880.
Anthracite....	1,015,259	681,400	810,517	557,695
Bituminous.....	257,642	207,319	160,538	201,647

SULLIVAN ANTHRACITE COAL PRODUCT.

This coal comes from Sullivan county, Pa., and is shipped over the State Line and Sullivan road to the P. & N. Y. R. R. This business is not included in the statistics elsewhere given :—

1871.....	24,665 tons.	1876.....	30,000 tons.
1872.....	54,966 tons.	1877.....	23,000 tons.
1873.....	35,267 tons.	1878.....	37,000 tons.
1874.....	33,896 tons.	1879.....	50,000 tons.
1875.....	16,522 tons.	1880.....	65,000 tons.

FLUCTUATIONS IN PRICES OF ANTHRACITE.

The following are said to represent the highest and lowest prices, during the years named, for Anthracite, by the cargo, at New York City.

	L.	H.		L.	H.		L.	H.
1860.....	\$5 50	\$6 00	1867.....	\$6 50	\$8 50	1874.....	\$4 55	\$5 55
1861.....	4 20	6 00	1868.....	6 50	11 50	1875.....	4 40	5 55
1862.....	4 25	8 50	1869.....	6 50	10 50	1876.....	3 75	5 55
1863.....	7 00	11 00	1870.....	4 50	8 50	1877.....	3 25	3 75
1864.....	9 00	15 00	1871.....	5 00	13 00	1878.....	2 75	4 50
1865.....	8 50	13 50	1872.....	3 75	6 25	1879.....	2 15	3 25
1866.....	8 50	13 00	1873.....	5 00	6 50	1880.....	3 50	4 45

THE PRODUCTION OF ANTHRACITE, LIVES LOST, &c.

The report of the Inspectors of Mines, for 1879, gives the following statistics :—

	Tons mined.	Employees.	Fatalities.	Coal mined to each employee.
I.....	1,855,164	6,242	24	297 tons.
II.....	4,386,969	11,080	43	395 tons.
III.....	3,816,122	11,094	46	344 tons.
IV.....	6,310,256	15,582	65	399 tons.
V.....	7,182,083	16,099	59	446 tons.
VI.....	4,156,186	8,750	25	478 tons.

I.—First, or Pottsville district. II.—Second, or Shenandoah district. III.—Third, or Shamokin district. IV.—Wilkes-Barre district. V.—Eastern district of Luzerne and Lackawanna counties. VI.—South district of Luzerne and Carbon counties. The tonnage mined (reported above), includes coal used about mines, and sold to employees. It averages seven to eight per cent. of the quantity marketed. The number mentioned as employed includes miners, laborers, and men and boys, inside and outside. The figures given as coal mined per employee, is the average annual quantity for each and every person employed, and not that to each miner.

## POTTSVILLE DISTRICT.

The collieries in this district are located in the first Anthracite coal field, and the production is known in market as Schuylkill and Lorberry coal; Mr. Samuel Gay, is the Mine Inspector.

<i>Collieries.</i>	<i>Operators.</i>	<i>Output in Tons.</i>
Black Heath,	Wm. H. Harris.	26,883
Wolf Creek Diamond,	Thomas & Parnell.	5,060
Wolf Creek Orchard,	James F. Donohue.	5,005
Ellsworth,	John R. Davis.	11,127
Monitor,	John Denning.	2,585
Peach Orchard,	Morgan & Brown.	1,744
Beechwood,	Phila. & Reading C. & I. Co.,	45,060
Wadesville shaft,	Phila. & Reading C. & I. Co.,	106,388
Pottsville shaft,	Phila. & Reading C. & I. Co.,	39,062
Pine Forest,	Phila. & Reading C. & I. Co.,	33,050
Eagle Hill shaft,	Phila. & Reading C. & I. Co.,	56,427
Pine Dale,	Rothermel & Co.,	.....
Eagle,	G. W. Johns & Bro.,	41,466
St. Clair,	Jos. Atkinson,	2,261
Newkirk,	Phila. & Reading C. & I. Co.,	.....
Palmer Vein,	Alliance Coal Mining Co.,	20,000
West Summit,	A. A. Raabe,	1,300
Shaft No. 1,	Wood & Pierce,	14,357
Middle Lehigh,	W. W. Price, Supt.,	57,251
Black mine,	Moodie & Co.,	3,500
Colket,	Phila. & Reading C. & I. Co.,	25,481
East Franklin.	Phila. & Reading C. & I. Co.,	34,419
Glendower,	Phila. & Reading C. & I. Co.,	25,739
Mine Hill Gap,	Phila. & Reading C. & I. Co.,	35,029
Otto,	Phila. & Reading C. & I. Co.,	35,639
Phoenix Park Nos. 2 and 3,	Phila. & Reading C. & I. Co.,	42,239
Richardson,	Phila. & Reading C. & I. Co.,	70,774
Swatora,	Phila. & Reading C. & I. Co.,	21,464
Thomaston,	Phila. & Reading C. & I. Co.,	77,186
Kalmia,	Phillips & Sheaffer,	78,067
Rausch Creek,	Miller, Greaff & Co.,	82,609
Lincoln,	Levi Miller & Co.,	125,171

The coal from these collieries is shipped to market by the Philadelphia and Reading Railroad and branches.

In addition to the above there are a number of small concerns mining coal, for local use mainly; the total for last year of these was 13,601 tons.

## SHAMOKIN AND LYKENS VALLEY DISTRICT.

This district includes the Lykens Valley, Shamokin, and the western Mahanoy regions; located in the western part of Schuylkill, eastern Northumberland and Dauphin counties; forming a portion of the first and second Anthracite coal fields. Mr. James Ryan is the Mine Inspector.

<i>Collieries.</i>	<i>Operators.</i>	<i>Output in Tons.</i>
Trevorton,	Phila. & Reading C. & I. Co.,	60,016
Bear Valley,	Phila. & Reading C. & I. Co.,	52,277
George Fales,	Phila. & Reading C. & I. Co.,	1,577
Burnside,	Phila. & Reading C. & I. Co.,	45,243
Cameron,	Mineral Railroad and Mining Co.,	158,760

<i>Collieries.</i>	<i>Operators.</i>	<i>Output, in Tons.</i>
Luke Fidler,	Mineral Railroad and Mining Co.,	111,782
Packer,	Mineral Railroad and Mining Co.,	.....
Pennsylvania,	Mineral Railroad and Mining Co.,	105,455
Lancaster,	Smith & Keiser,	14,883
Peerless,	Cruikshank & Co.,	29,197
Henry Clay,	J. Langdon & Co.,	109,691
Stirling,	Kendrick & Co.,	80,930
Buck Ridge,	May, Audenried & Co.,	53,768
Big Mountain,	Patterson, Llewellyn & Co.,	136,711
Carson,	P. Goodwill,	11,460
Greenback,	H. J. Toudy,	25,805
Excelsior,	Excelsior Coal Mining Co.,	104,308
Enterprise,	Enterprise Coal Co.,	79,115
Mt. Carmel shaft,	Phila. & Reading C. & I. Co.,	142,981
Locust Spring,	Phila. & Reading C. & I. Co.,	93,452
Reliance,	Phila. & Reading C. & I. Co.,	79,649
Stuartville,	Montelius, Robinson & Co.,	57,970
Black Diamond,	W. Schwenk & Co.,	26,518
Montana,	Montana Coal Co.,	10,000
Locust Gap,	Græber & Shepp,	92,393
Ben Franklin,	Baumgardner & Co.,	38,379
Monitor,	Geo. W. Johns & Bro.,	119,944
Short Mountain,	Lykens Valley Coal Co.,	165,623
Williamstown,	Summit Branch R. R. Co.,	227,436
West Brookside,	Phila. & Reading C. & I. Co.,	410,315
Bast,	Phila. & Reading C. & I. Co.,	141,436
Helfenstein,	Phila. & Reading C. & I. Co.,	.....
Keystone,	Phila. & Reading C. & I. Co.,	27,604
Locust Run,	Phila. & Reading C. & I. Co.,	.....
Merriam,	Phila. & Reading C. & I. Co.,	64,346
Potts,	Phila. & Reading C. & I. Co.,	88,493
North Ashland,	Phila. & Reading C. & I. Co.,	128,118
Preston, Nos. 2 and 3,	Phila. & Reading C. & I. Co.,	184,822
Tunnel,	Phila. & Reading C. & I. Co.,	71,413
Franklin,	A. A. Heim,	2,172
Centralia,	G. M. Provost,	37,805
Hazle Dell,	Geo. Troutman,	13,193
Big Mine Run,	J. Taylor & Co.,	63,304
Continental,	Lehigh Valley Coal Co.,	107,603
Glen City,	J. A. Losee,	26,762
Franklin No. 2,	S. Bickel,	14,085

Coal goes to market via Northern Central, Philadelphia & Reading and Lehigh Valley Railroads. Figures from West Brookside, to the end, are for the year 1879.

#### LEHIGH DISTRICT.

This district includes those collieries in the southern part of Luzerne county and Carbon county, and is known as the Lehigh region. The Mine Inspector in charge is Mr. T. D. Jones.

<i>Collieries.</i>	<i>Operators.</i>	<i>Output, in Tons.</i>
2 Collieries,	Upper Lehigh Coal Co.,	307,032
Pond Creek,	Pond Creek Coal Co.,	23,412
Sandy Run, No. 1,	M. S. Kemmerer & Co.,	117,920
Highland 1 and 2,	Lehigh Valley Coal Co.,	165,562



<i>Collieries.</i>	<i>Operators.</i>	<i>Output, in Tons.</i>
Cross Creek, 1, 2 and 3,	Coxe Bros. & Co.,	396,835
Lattimer, 1 and 2,	Pardee Bros. & Co.,	218,748
Minersville, 6 and 7,	Stout Coal Co.,	95,943
Hollywood, No. 1,	Calvin Pardee & Co.,	94,500
Buck Mountain,	Buck Mountain Coal Co.,	114,193
Council Ridge, No. 2 and 5,	J. Leisenring & Co.,	181,027
Oak Dale, No. 1 and 2,	Lehigh Valley Coal Co.,	170,926
Ebervale, 2 and 3,	Ebervale Coal Co.,	210,215
Harleigh,	McNair & Co.,	54,286
Middle, Lower and West Cross Creek,	Coxe Bros. & Co.,	.....
East Sugar Loaf, 2, 3 and 5,	Lindermann, Skeer & Co.,	182,000
7 Collieries,	A. Pardee & Co.,	503,222
Mt. Pleasant,	Pardee, Sons & Co.,	94,257
Humboldt,	Linderman, Skeer & Co.,	70,000
Coleraine, 1 and 2,	W. T. Carter & Co.,	140,000
Spring Mountain, 1, 4 and 5,	Lehigh Valley Coal Co.,	178,000
Beaver Brook,	C. M. Dodson & Co.,	66,000
Yorktown,	G. H. Myers & Co.,	141,409
10 Collieries,	Lehigh Coal and Navigation Co.,	650,000
Tresckow,	Lehigh and Wilkes-Barre Coal Co.,	110,003
Upper Lehigh Coal Co., M. S. Kemmerer & Co., Pond Creek, Council Ridge, Cross Creek, G. H. Myers & Co., Lehigh and Wilkes-Barre Coal Co., and Lehigh Coal and Navigation Co., ship over the Central Railroad of New Jersey. (L. & S. Division). Others via the Lehigh Valley Railroad.		

## SHENANDOAH DISTRICT.

This district includes those collieries in the eastern portion of the second Anthracite coal field; forming what is known as the Shenandoah and East Mahanoy regions, and is in charge of R. Mauchline, Mine Inspector.

<i>Collieries.</i>	<i>Operators.</i>	<i>Output, in Tons.</i>
Girard,	Phila. & Reading C. & I. Co.	81,894
Hawmond,	Phila. & Reading C. & I. Co.	70,650
Connor,	Phila. & Reading C. & I. Co.	107,995
Girard Mammoth,	Phila. & Reading C. & I. Co.	722
Cuyler,	S. M. Heaton & Co.	147,152
Colorado,	Lehigh Valley Coal Co.	71,530
Shenandoah,	Lehigh Valley Coal Co.	126,225
Packer,	Lehigh Valley Coal Co.	178,713
Lehigh,	Lehigh Valley Coal Co.	79,662
William Penn,	William Penn Coal Co.	174,000
Kohinoor,	R. Hecksher & Co.	159,814
Turkey Run,	Phila. & Reading C. & I. Co.	88,289
West Shenandoah,	Phila. & Reading C. & I. Co.	111,042
Plank Ridge,	Phila. & Reading C. & I. Co.	91,760
Indian Ridge,	Phila. & Reading C. & I. Co.	118,338
Ellangowan,	Phila. & Reading C. & I. Co.	187,262
Knickerbocker,	Phila. & Reading C. & I. Co.	100,323
Shenandoah,	Phila. & Reading C. & I. Co.	52,689
Kehley Run,	Thomas Coal Co.	80,832
Cambridge,	Cambridge Coal Co.	5,122
Coal Run,	Suffolk Coal Co.	93,292
East Bear Ridge,	Myers, McCreary & Co.	64,005
West Bear Ridge,	Myers, McCreary & Co.	64,549

<i>Collieries.</i>	<i>Operators.</i>	<i>Output, in Tons.</i>
Stanton,	Miller, Hoch & Co.	62,803
Draper,	John Milnes.	87,982
Furnace,	Phila. & Reading C. & I. Co.	35,336
Gilberton,	Phila. & Reading C. & I. Co.	13,230
Boston Run,	Phila. & Reading C. & I. Co.	67,956
Bear Run,	Phila. & Reading C. & I. Co.	30,277
St Nicholas,	Phila. & Reading C. & I. Co.	69,931
Tunnel Ridge,	Phila. & Reading C. & I. Co.	3,459
Elmwood,	Phila. & Reading C. & I. Co.	7,960
Mahanoy City,	Phila. & Reading C. & I. Co.	98,614
North Mahanoy,	Phila. & Reading C. & I. Co.	89,752
Schuylkill,	Phila. & Reading C. & I. Co.	9,266
Staffordshire,	Jones, Ward & Co.	8,112
Glendon,	J. C. Haydon & Co.	89,507
Coplay,	L. F. Lentz	57,026
North Star,	Reynolds, Roberts & Co.	15,414
Webster,	L. S. Baldwin.	15,167
Oak Dale,	E. L. Powel.	3,896
Honey Brook, 1, 4 & 5,	Lehigh and Wilkes-Barre Coal Co.,	315,643
Hillside,	Harris Sparr & Co.	.....
Laurel Ridge,	John A. Dutter,	13,000
Lawrence,	Lawrence, Merkle & Co.	102,000
Eureka,	E. Gorman & Co.	.....
West Lehigh,	Fisher Hazard.	18,553
Primrose,	Primrose Coal Co.	38,660

The production of these collieries is forwarded to market by the Philadelphia and Reading, and the Lehigh Valley Railroads. The Lehigh Valley Coal Company, J. C. Haydon & Co., L. F. Lentz, West Lehigh, and Primrose ship by the Lehigh Valley road.

### WILKES-BARRE DISTRICT.

This district is in the third or Northern coal field, and includes what is called the middle district of Luzerne county, and is usually known as the Wilkes-Barre region; and is in charge of G. M. Williams, Mine Inspector.

<i>Collieries.</i>	<i>Operators.</i>	<i>Output, in Tons.</i>
10 Collieries,	Lehigh and Wilkes-Barre Coal Co.,	1,542,649
9 Collieries,	Delaware and Hudson Canal Co.,	1,032,104
5 Collieries,	Susquehanna Coal Co.,	772,509
5 Collieries,	Lehigh Valley Coal Co.,	657,269
3 Collieries,	D. L. & W. R. R.,	224,479
Salem,	Salem Coal Co.,	40,000
Warrior Run,	A. J. Davis,	48,000
Franklin,	Franklin Coal Co.,	116,597
Hillman,	H. Baker Hillman,	48,000
Maltby,	S. C. Maltby,	86,333
Hutchinson,	J. C. Hutchinson,	79,910
East Boston,	W. G. Payne & Co.,	93,000
2 Collieries,	Kingston Coal Co.,	304,523
Chauncey,	McFarland & Co.,	16,811
Gaylord,	Gaylord Coal Co.,	80,782
Enterprise,	H. C. Roberts & Co.,	106,113
Forty Fort,	J. H. Swoyer,	94,703
Wyoming,	J. H. Swoyer,	145,841
Hollenbeck,	R. S. Pool,	23,190

<i>Collieries,</i>	<i>Operators.</i>	<i>Output, in Tons.</i>
Red Ash,	Red Ash Coal Co.,	65,000
Dodson,	Plymouth Coal Co.,	48,219
Raubville,	Waddell & Walter,	48,102

D. & H. C. Co's coal goes out via their Mill Spring branch. Other coal via L. & B. branch of D. L. & W. R. R.; via Lehigh Valley road south and east; via P. & N. Y. R. north and west; via Central R. R. of N. J.; via Pennsylvania Canal.

## SCRANTON DISTRICT.

This district is in the third or Northern coal field, and includes what are called the Lackawanna, Scranton and Pittston regions, located in Luzerne and Lackawanna counties; this district is in charge of W. S. Jones, Mine Inspector.

<i>Collieries.</i>	<i>Operators.</i>	<i>Output, in Tons.</i>
18 Collieries,	Del., Lack. & W. R. R. Co.	1,504,716
15 Collieries,	Pennsylvania Coal Co.,	1,090,640
11 Collieries,	Del. & Hud. Canal Co.,	2,229,856
Everhart,	Everhart Coal Co.,	43,028
Tompkins shaft,	Alva Tompkins,	21,050
Greenwood,	Pittston Coal Co.,	76,465
Beaver,	Waterman & Co.,	15,082
Phoenix Shaft,	Phoenix Coal Co.,	47,930
Columbia,	Grove Brothers,	14,981
Butler shaft,	Butler Colliery Co.,	51,232
4 Collieries,	Hillside Coal Co.,	270,989
3 Collieries,	Lack. and Susq. Coal and Iron Co.,	130,444
Meadow Brook,	Wm. Connell & Co.,	94,206
National,	Wm. Connell & Co.,	91,586
Park Slope,	School Fund Association,	64,517
Mt. Pleasant,	W. T. Smith,	98,000
Capouse shaft,	Lackawanna Iron and Coal Co.	175,855
Pine Brook shaft,	Lackawanna Iron and Coal Co.,	137,596
Fairlawn shaft,	Fairlawn Coal Co.,	40,029
Jermyn's new shaft,	John Jermyn,	125,068
Green Ridge,	Green Ridge Coal Co.,	103,465
Roaring Brook shaft,	Roaring Brook Coal Co.,	91,992
Elk Hill,	Elk Hill Coal Co.,	39,986
Filer Nos. 1 & 2,	Filer & Livey,	111,061
Pierce,	Pierce Coal Co.,	75,666
Eaton,	Jones, Simpson & Co.,	60,665
Jermyn slope,	John Jermyn,	40,630
Jermyn shaft,	John Jermyn,	91,966
Chestnut Hill,	E. E. Hendricks & Co.,	.....
Elk Creek,	Thos. Brennan,	26,380
Sibley,	Eliot & Co.,	77,691
Clark,	Watkins & Williams,	12,325

Everhart coal goes to market via C. R. R. of N. J. The D. L. & W., Delaware and Hudson, Pennsylvania Coal Co., P. & N. Y. R. R. and "Erie" companies have branches or connections into this coal field—shipments being made north, west and east by these lines. The local consumption is large, as the furnaces and rolling mills at Scranton are a special feature of this coal region. The total output in 1880, was 6,293,-457 tons (including 299,688 tons for local consumption, beside above tonnage,) and there were but 37 fatalities, or one to each 170,093 tons raised.

## THE CUMBERLAND REGION.

The Cumberland (Georges Creek) coal field, located in Allegheny county, at the western extremity of the State of Maryland, supplies an important proportion of the semi-Bituminous coal reaching the seaboard markets. The connections with the tide-water markets are (1) via the Baltimore and Ohio Railroad, from the town of Cumberland 178 miles, and Piedmont, 206 miles west from Baltimore. (2) The Chesapeake and Ohio canal, from Cumberland to Georgetown, 184 miles, and Alexandria 191 miles. The boats carry 110 tons, and make the trip in four to five days. The canal is owned by the State of Maryland, and is managed by a Board of Public Works. (3) The Pennsylvania State Line branch, which taps the Cumberland and Pennsylvania railroad near Mt. Savage (this gives an outlet to the Pennsylvania Railroad and its connections, for South Amboy N. J.) (4) The Georges Creek and Cumberland Railroad, from the mines near Lonaconing, to Cumberland, thence by canal; and to the Pennsylvania Railroad.

Baltimore and Ohio Railroad began carrying this coal in 1842, the Chesapeake and Ohio canal in 1850; the Pennsylvania State line branch in 1872. The Georges Creek and Cumberland was completed in December, 1880.

The total business since the beginning, in 1842, to the end of 1880, foots up 38,637,068 tons, divided as below :—

Baltimore and Ohio railroad.....	24,058,949 tons.
Chesapeake and Ohio canal.....	12,396,816 tons.
Pennsylvania railroad.....	1,181,303 tons.

We recapitulate the tonnages of the ten years past, to show the fluctuations of trade.

	<i>B. &amp; O.</i>	<i>C. &amp; O.</i>	<i>P. S. L.</i>	<i>Total.</i>
1871.....	1,494,814	850,339	.....	2,345,153
1872.....	1,517,317	816,103	22,021	2,355,471
1873.....	1,780,710	778,802	114,589	2,674,101
1874.....	1,576,160	767,064	67,671	2,410,895
1875.....	1,302,237	879,838	160,698	2,342,778
1876.....	1,070,775	632,410	131,866	1,835,081
1877.....	818,450	584,996	170,884	1,574,339
1878.....	924,254	609,204	145,864	1,679,352
1879.....	1,075,198	501,247	151,264	1,730,709
1880.....	1,319,589	603,125	213,460	2,136,160

Labor in this region has always been well remunerated and there was no reduction in the price of mining the coal, from 1866, up to 1877; while on the other hand, the price of coal at the shipping points fell off about one-half within that period of time.

We append a few statistics in this connection, showing the changes that have occurred:

1855—June, 35 cents, at which rate it remained until August, when it was reduced to 30 cents.

1856—January, to May, 1862, 30 cents.

1862—In June advanced to 40 cents, and in September to 45 cents.

1863—January, to March 1864, 50 cents.

1864—In April advanced to 60 cents, and in June to 75 cents.

1864—September, to May, 1865, \$1.00.

1865—In June, reduced to 75 cents, at which it continued to May, 1866.

1866—May reduced to 65 cents.

1877—In January reduced to 50 cents, advanced in August to 55 cents.

1878—March 40 cents, at which it continued until October 15, 1879.

1879—October, 50 cents, at which rate till February, 1880.

1880—February advanced to 65 cents.



Freight paid boatmen on Chesapeake and Ohio Canal from Cumberland to Georgetown, \$1.00 per ton, plus tolls 55 cents, and expenses at Georgetown, 20 cents=\$1.75. Freight from Cumberland by Baltimore and Ohio Railroad to Baltimore, \$2.33 per gross ton. To South Amboy, N. J., 360 miles, via Pennsylvania State Line, Huntingdon and Broad Top, and Pennsylvania Railroads, about \$3.60 per ton. From mines to Cumberland via Cumberland and Pennsylvania Railroad, average two cents per mile. The mines of this coal field are located near to, or upon the line of the Cumberland and Pennsylvania road, and they are distant one and one-half to twenty miles from Piedmont, and from eleven to thirty-three miles from Cumberland. The mines are with one exception (the Borden shaft) drift openings in the hillside; the coal being let down inclined planes, ranging from 300 to 2,000 feet in length, to the Cumberland and Pennsylvania road. The New Georges Creek and Cumberland road is located so that there is no need for these inclined planes, at such mines as can ship over that line.

The production of the several companies, during 1877-80, is shown below:—

<i>Company.</i>	<i>Tons, 1877.</i>	<i>Tons, 1878.</i>	<i>Tons, 1879.</i>	<i>Tons, 1880.</i>
Consolidation.....	348,385	404,015	483,692	552,484
New Central.....	346,038	352,848	334,260	350,184
Borden.....	97,907	121,383	157,568	157,533
Georges Creek C. & I. Co....	121,553	87,910	129,932	235,599
Hampshire.....	91,516	119,476	106,584	98,739
Franklin.....	45,220	134,481	102,283	102,821
American.....	117,434	105,538	98,927	124,901
Potomac.....	63,659	56,256	75,955	77,431
Maryland.....	120,543	120,311	69,036	113,445
Atlantic.....	96,211	79,778	71,626	62,802
Swanton.....	49,096	37,620	41,579	41,741
Blæn Avon.....	33,769	28,304	40,737	45,921
Piedmont.....	35,796	27,189	15,612	14,007
Miscellaneous.....	3,220	4,157	2,898	367
Total of the region.....	1,574,339	1,679,322	1,730,709	2,082,703

The total for 1880, in addition to the production of the companies named above, includes 50,538 tons produced by the Georges Creek Mining Company, and 54,189 tons produced at the Virginia mines of H. G. Davis & Bro. There is a local trade of about 75,420 tons, which is not included in the above returns, for last year. The tons named above are all of 2,240 lbs., as the coal is mined, transported and sold at that rate.

In the tonnage credited to Baltimore and Ohio Railroad for the year 1880, there is included 143,760 tons used by the company in locomotives, rolling mills, etc.

During the year 1880, there was an improved tonnage, compared with recent years, at a higher range of prices, but the increase in prices was divided between the miners and carrier, so that the operator realized but little of the apparently large advance in the prices. The range in price of Cumberland coal at Baltimore is as stated below:

<i>Year.</i>	<i>Prices.</i>	<i>Year.</i>	<i>Prices.</i>	<i>Year.</i>	<i>Prices.</i>
1871.....	\$4 72	1875.....	\$4 42	1879.....	\$2 75
1872.....	4 66	1876.....	3 93	1880.....	3 75
1873.....	4 85	1877.....	3 34		
1874.....	4 63	1878.....	3 00		

## NORTH PENNSYLVANIA SEMI-BITUMINOUS COAL FIELD.

In Bradford, Lycoming and Tioga counties, Pennsylvania, is found a superior quality of semi-Bituminous coal that has been worked for many years, and disposed of to the railways of New York State, to rolling mills and for blacksmithing purposes, with the best possible results, as to its economic use for the several purposes named. We have in this coal field, the Blossburg, McIntyre and Barclay districts. The first coal was sent to market from the Blossburg district, (the Bloss mines) in 1840. The business done by the several companies operating in the BLOSSBURG DISTRICT since the opening of the mines, in the year 1840, has been as below:—

Arbon Coal Company, 1840-43.....	49,633 net tons.
Wm. H. Mallory, 1844-57 .....	405,113 net tons.
D. S. Magee, 1856-59.....	78,996 net tons.
Tioga Transportation Company.....	323,174 net tons.
Salt Company of Onondaga, 1863-66.....	267,809 net tons.
Morris Run Coal Company, 1864-81.....	4,513,120 net tons.
Fall Brook Coal Company, 1860-81.....	4,249,887 net tons.
Blossburg Coal Company, 1866-81.....	2,796,193 net tons.

Total production of the district.....12,833,903 net tons.

## Production of the Blossburg district, during the years named.

Year.	Tons.	Year.	Tons.
1871.....	815,079	1876.....	616,984
1872.....	849,262	1877.....	602,245
1873.....	991,057	1878.....	652,597
1874.....	796,388	1879.....	874,010
1875.....	581,782	1880.....	921,555

There is a railway connection with the system of the "Erie," at Corning and Elmira, and with the "New York Central," at Syracuse, and Geneva and Lyons. By this means, there is a trade done wherever these lines extend to, or connect with.

The tonnage for 1880, was produced by the companies in the following quantities: Blossburg, 304,482; Morris Run, 291,613; Fall Brook, 325,460. The Blossburg Company have 200 coke ovens at Arnot, and is producing an excellent article of coke thereat, selling it in all parts of the country.

At Ralston, in Lycoming county, Pa., on the line of the Northern Central Railway, (54 miles south from Elmira, N. Y.,) are the mines of the MCINTYRE COAL COMPANY. The coal is of the same general nature as that of the companies noted above. The company began operations in the year 1870, and 17,802 tons were shipped in that year. Details since then have been as below:—

Year.	Tons.	Year.	Tons.
1871.....	106,138	1876.....	208,701
1872.....	171,420	1877.....	183,715
1873.....	212,462	1878.....	154,205
1874.....	138,907	1879.....	127,632
1875.....	164,507	1880.....	216,225

In Bradford county, are the mines of the TOWANDA COAL CO., the SCHRADER COAL CO., and the LONG VALLEY COAL CO. The BARCLAY COAL CO., are now the owners of all the coal area in the Barclay district, (excepting the Schrader) and lease the mines and railroad to the "Towanda" and "Long Valley" Co's. The railway connection from Towanda, is by the P. & N. Y. Railroad north to the "Erie," at Waverly; the Southern Central at Sayre, and the Geneva, Ithaca & Sayre; south to the Lehigh Valley railroad. We append details of the tonnage of this district.

*The Barclay Coal Company—1856-1867.*

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1856.....	2,295	1860.....	27,718	1864.....	62,058
1857.....	6,265	1861.....	40,835	1865.....	48,375
1858.....	17,560	1862.....	52,779	1866.....	37,968
1859.....	30,143	1863.....	54,535	1867.....	30,119

*The Fall Creek Coal Company—1865-1875.*

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1865.....	16,936	1869.....	4,303	1873.....	85,315
1866.....	29,604	1870.....	77,025	1874.....	21,281
1867.....	16,953	1871.....	129,095	1875.....	18,507
1868.....	6,595	1872.....	118,882		

*The Schrader Coal Company.*

1874.....	100,219 tons.	1878.....	149,285 tons.
1875.....	157,686 tons.	1879.....	144,946 tons.
1876.....	200,795 tons.	1880.....	216,802 tons.
1877.....	175,755 tons.		

The coal from this operation is sold mainly to the New York Central, to the Southern Central, and to the Geneva, Ithaca & Sayre railroads.

*The Towanda Coal Company.*

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1865.....	7,886	1871.....	249,240	1876.....	160,343
1866.....	31,881	1872.....	263,960	1877.....	164,344
1867.....	27,668	1873.....	252,329	1878.....	165,035
1868.....	67,080	1874.....	215,572	1879.....	237,608
1869.....	176,307	1875.....	200,424	1880.....	246,064
1870.....	196,310				

This coal goes to the "Erie" Railway for supply coal to their engines, etc.

Long Valley only began operations in December, 1880, and the production is not reported. The mines are the most northerly in the State of Pennsylvania.

RECAPITULATION OF OUTPUT OF COAL IN NORTHERN COAL FIELD, during the year 1880:—

Blossburg Coal Co.....	304,482 tons.
Morris Run Coal Mining Co.....	291,613 tons.
Fall Brook Coal Co.....	325,460 tons.
McIntyre Coal Co.....	216,225 tons.
Schrader Coal Co.....	216,802 tons.
Towanda Coal Co.....	246,604 tons.





## McKEAN COUNTY, PA.

In this county there is a large deposit of prime Bituminous coal. There are two points from which coal is mined and marketed at present. At the eastern portion of the basin, the Buffalo Coal Company is at work near Clermont. The McKean and Buffalo Railroad extending from Larabees on the B., N. Y. & P. road gives an outlet to Buffalo and Rochester, the distance from the mines being 108, and 150 miles respectively, to the points named. Output of coal by the Buffalo Coal Company, since the opening of the mines.

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1875.....	33,501	1878.....	72,098
1876.....	81,830	1879.....	85,745
1877.....	73,222	1880.....	100,046

We give the following analyses of three samples from the Pennsylvania Geological Survey Report of 1875 :—

Water.....	1.130	1.300	1.170
Volatile matter.....	33.090	39.830	35.440
Fixed Carbon.....	53.006	52.063	43.992
Sulphur.....	1.874	1.727	1.708
Ash.....	10.900	5.080	17.690

The Bradford branch of the 'Erie' railway runs into the central portion of this county, and there is a small tonnage originating on this line. We have the report of the Butts mines located at Alton and operated by J. E. Butts, Jr. The annual product is about 25,000 tons. The tonnage produced since the opening of the mines to the end of 1880, is 170,000 tons in all.

## REYNOLDSVILLE REGION.

<i>Name of Mines.</i>	<i>Location.</i>	<i>Operators.</i>
Pancoast,	Pancoast, Jefferson Co.,	Heim, Goodwill and F. Williams.
Washington,	Pancoast, Jefferson Co.,	Frank Williams.
Diamond,	Reynoldsville, Jefferson Co.,	Diamond Coal Company.
Hamilton,	Reynoldsville, Jefferson Co.,	Hamilton Coal Company.
Soldier Run,	Reynoldsville, Jefferson Co.,	Powers, Brown & Co.
Sandy Lick,	Du Bois, Clearfield Co.,	Sandy Lick Coal and Coke Co.
Rochester,	Du Bois, Clearfield Co.,	Bell, Lewis & Yates.
Clearfield,	Tyler Station, Clearfield Co.,	Clearfield Coal Company.

The coal mines in this region or district are located along the line of the Allegheny Valley Railroad, in Jefferson and Clearfield counties, Pennsylvania. It is of most excellent quality for general steam purposes. Wherever it has had a trial its record has been of such a character as to warrant an increased demand. The vein of coal opened in this immediate region is designated as the lower Freeport bed, and varies in thickness from five to eight feet, while that of the upper Freeport bed is opened in but few places near the centre of the basin, showing a thickness of about five feet. These two veins are included in the middle measures, and are above water level. The analyses made by the Survey show the coal to be of even character, and we take as an average: 32.90 volatile; 62.194 fixed carbon; 3.10 ash; 1.10 moisture; sulphur .726. The tonnage for 1880, was 403,419 net tons, as compared with 274,810 tons in 1879. At the beginning of

the year trouble between the miners and operators impeded progress toward a larger output and during the later months a scarcity of cars. Had all things worked harmoniously there can be no doubt the shipments would have been at least one-third greater.

The coal has been coked with success; at the close of the year 1880 there was a total of ninety ovens completed, and some ten thousand tons of coke had been shipped to market, going in part to iron works at Chicago. It is of silvery lustre, very compact, but cellular, tenacious, almost absolutely free from impurities, has a metallic ring, and according to practical observation, is capable of bearing a heavy burden in the furnace. Messrs. Powers, Brown & Co., and Bell, Lewis & Yates have been coking coal from their mines.

The coal worked at Tyler Station, shows by analysis :—Fixed carbon, 61.56 ; Volatile matter, 31.06 ; Ash, 4.95 ; Sulphur, 1.49 ; Water, 0.94. Seam is four feet in thickness, and it is said that this seam belongs to the third coal basin, and is not the same as that worked near Houtzdale.

The outlook for this region is most encouraging, and with a shorter outlet to the markets of the north and west (from Buffalo as a shipping point) there is no coal region that is capable of more encouraging returns upon the capital invested. An extension of the Bradford division of the 'Erie', into this country, would make Buffalo not more than 150 miles away from this important coal region.

The amount of coal in this coal field is very extensive ; there being several fine seams of coal, and they would be developed much more extensively were the railway facilities such as to warrant the putting of capital into the business of coal mining and shipping. With the natural outlet to the Lakes by the way of Falls Creek, etc. completed, the tonnage of the region should be doubled. Before another year we may have to record at least the commencement of this long talked of, and much to be desired, outlet to market.

## ALLEGHENY MOUNTAIN REGION.

We place in this region, the collieries located near to or upon (including branch lines) the Pennsylvania Railroad, in Blair and Cambria counties. They are as below :

### BLAIR COUNTY.

Horseshoe mine,	S. C. Baker,
Glenwhite mine,	Glenwhite Coal Co.
Porter mines,	Denniston, Porter & Co.
Bennington shaft,	Blair Iron and Coal Co.
Lemon Vein,	Kittanning Coal Co.

### CAMBRIA COUNTY.

Lloyds mines,	Bell's Gap R. R. Co.
Sonman mines,	W. H. Piper & Co.
Benn's Creek,	S. H. Smith & Co.
Lilly's mines,	Dysart, Laughman & Co.
Old South Fork mine,	South Fork Coal Works Co.
Argyle mines,	Argyle Coal Co.
Stineman mines,	J. C. Stineman.
Johnstown mines,	Cambria Iron Co.
Tiley mines,	Wm. Tiley & Co.
Martin mine,	J. C. Martin.

The output must reach up to nearly, if not quite a million tons per annum, as there are several very large consumers of coal in these counties, and the Pennsylvania Railroad carried to outside markets over 300,000 tons during the year 1880. There is a coke business also of considerable importance, for home use and shipment. We notice that the Pennsylvania Railroad carried 65,000 tons last year. We append an analysis of the Sonman vein coal :—Volatile matter, 18.30 ; Fixed carbon, 78.60 ; Ash, 2.70 ; Sulphur, 0.40.

## WESTMORELAND REGION.

This region is in Westmoreland county and is one of the most important coal districts in the state of Pennsylvania, in regard to the quality and quantity of coal produced. Westmoreland coal analysed as follows:—volatile matter, .36; fixed carbon, .58; ash, .60. The celebrated Penn and Westmoreland Gas coal is mined near Penn and Irwin stations, on the Pennsylvania Railroad, in Westmoreland county; the distance from Philadelphia is 332 miles. The coal mined is the great Pittsburgh bed of Bituminous coal. The companies operating in this region are large and influential, among them being the Penn Gas Coal Company, W. L. Scott & Co., Waverly Coal and Coke Company and the Westmoreland Gas Coal Company. The coal is used in every seaboard city for gas purposes, and always commands the highest price. The shipments east are via the Baltimore and Ohio (Pittsburgh, Washington and Baltimore division,) and the Pennsylvania; to Baltimore, South Amboy and Philadelphia. We append a list of the collieries and operators in this region, with their location and outlets to market.

<i>Mines.</i>	<i>Operators.</i>	<i>Mines.</i>	<i>Operators.</i>
Shaft Nos. 2 and 3,	Penn Gas Coal Company.	Overton,	A. C. Overholt.
Mine No. 4,	Penn Gas Coal Company.	Rising Sun,	Markle & Co.
Located upon and ship via Youghiogheny Railroad, to Pennsylvania Railroad.		Buckeye,	John M. Cochran.
Coal Run,	Penn Gas Coal Co.	Mullen,	M. Mullen.
Shaft No. 1,	Penn Gas Coal Co.	Upper and Lower Slope,	Boyle & Hazlett.
Spring Hill,	Westmoreland Coal Co.	Located upon and ship via Mt. Pleasant branch, to Pittsburgh, Washington and Baltimore Railroad at Mt. Pleasant.	
New Larimer,	Westmoreland Coal Co.	New Slope,	C. P. Markle & Son.
Old Larimer,	Westmoreland Coal Co.	Hurst,	Hurst & Stoner.
South Side,	Westmoreland Coal Co.	South West,	South West Coal Co.
North Side,	Westmoreland Coal Co.	Greensburg,	Greensburg Coal Co.
Shafton,	Westmoreland Coal Co.	Enterprise,	Dillinger & Suttle.
Foster Slope,	Westmoreland Coal Co.	.....	J. W. Schoonmaker.
Westmoreland Shaft,	Westmoreland Coal Co.	Located upon and ship via South-West Pennsylvania Railroad—main line of Pennsylvania Railroad at Greensburg.	
Latrobe,	M. Saxman, Jr. & Co.	White Ball,	Youghiogheny Coal Hollow C. Co.
Loyal Hanna,	Loyal Hanna Coal Co.	Armstrong,	C. H. Armstrong & Co.
Millwood Shaft,	Millwood Coal & Coke Co	Ocean,	W. L. Scott & Co.
Morgan,	Edgar Thompson Steel Co	Black Ball,	N. J. Bigley.
New Slope,	Greensburg Coal Co.	Markle,	O. P. Markle & Co.
Located upon Pennsylvania Railroad.		White Heath,	Robt. Latimore.
Leechburg,	David B. Ashbaugh.	Waverly,	Waverly Coal and Coke Co.
Mill Bank,	Laufman & Co.	Jacobs Creek,	Fox, Kiffer & Co.
Saltsburg,	Saltsburg Coal Co.	Osceola,	Osceola Coal Co.
Cokeville,	Isabella Furnace Co.	.....	John Blythe & Co.
Located upon and ship via West Pennsylvania Railroad.		Located on P. W. & B. Railroad.	

The output of coal and coke in this region must be upwards of two and a half millions of tons. The Pennsylvania Railroad Co., carried out from it, during 1880, 900,000 tons coal, and 150,000 tons coke. Previously thereto their shipments of coal had been as follows :

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1874.....	952,971	1877.....	786,039
1875.....	796,968	1878.....	692,586
1876.....	902,139	1879.....	816,302

## THE MONONGAHELA REGION.

By means of its slack-water navigation, the Monongahela river is made navigable at all seasons of the year, and boats carrying eight hundred tons are passed down. The city of Pittsburgh is supplied mainly by railroad, and the larger portion of the coal shipped by river is run down the Ohio and Mississippi to the lower markets. The following statement of shipments by the slack-water navigation, from 1860 to date, is of interest.

<i>Year.</i>	<i>*Tons.</i>	<i>Year.</i>	<i>*Tons.</i>
1860.....	1,517,909	1871.....	1,944,852
1861.....	34,630	1872.....	2,291,220
1862.....	743,358	1873.....	2,094,312
1863.....	1,134,150	1874.....	2,503,504
1864.....	1,402,828	1875.....	2,275,265
1865.....	1,580,791	1876.....	2,495,800
1866.....	1,704,212	1877.....	2,677,460
1867.....	1,202,908	1878.....	2,797,530
1868.....	1,812,040	1879.....	2,628,232
1869.....	2,100,504	1880.....	3,361,934
1870.....	2,303,856		

\*We have estimated 25 bushels, of 80 lbs., to the ton of 2,000 lbs.

The business done by the various railroads entering or passing through this coal field, is indicated by the fact that in 1880 the Pennsylvania Railroad carried upwards of 4,000,000 tons of coal and coke from this district. In this connection the cost of transporting coals over waterways, as from Pittsburgh to New Orleans, is of value. The distance is something like 2,000 miles, the rate is about  $3\frac{3}{4}$  cents per bushel, or \$1.05 per ton of 2,240 lbs.; the ordinary time being about two weeks when all circumstances are favorable. From Pittsburgh to Louisville, Ky., the distance is about 600 miles; the cost  $1\frac{3}{4}$  cents per bushel, including return of empty craft; and the time five days. The shipments of coal and coke by the river to points below do not grow at any perceptible pace of late years. There were more 'runs' during 1880, than for several seasons, and yet the tonnage is little in excess of the business of 1879, when there was no boat-  
ing stage of water below Pittsburgh, from May 1 to November 15. This state of affairs is probably due to the competition of coal going out of the Kanawha and from the mines along the Ohio. The fact of increased rail communications from the mines in the Pittsburgh region, may have somewhat to do with the small business by water. The railroad trade is increasing each year, and the business for 1880 is stated at 1,500,000 tons per annum. Coal going out by water sells at very low rates in the lower markets. Wholesale rate f. o. b. at Pittsburgh being \$1.59 per net ton in January this year was only \$2.91 at Louisville, 600 miles away, and \$3.90 at New Orleans, 2000 miles distant from the mines. There was about 200,000 tons of coke sent out by water last year. Tolls on the Monongahela are  $2\frac{1}{2}$  mills per bushel. Following is a list of the "coal works" and, their owners located upon the Monongahela river, and shipping by the same.



## IN ALLEGHENY COUNTY.

Keelings,	Birmingham Coal Co.
American Works,	Jones & Laughlin.
Becks Run mine,	H. B. Hays & Bro.
.....	Jos. Walton & Co.
Six Mile Ferry (2 pits.)	H. B. Hays & Bro.
Street Run,	I. D. Risher.
Green Springs,	Thomas Fawcett.
McCluskey,	W. H. Brown's heirs.
Keystone Nos. 1 & 2,	W. H. Brown's heirs.
.....	Wm. Neel.
Amity Nos. 1 & 2,	J. C. Risher & Co.
Camden,	Geo. Lysle & Sons.
Coal Valley,	W. Stone's heirs.
Allequippa,	O'Niell & Co.
Rock Run,	W. J. Snodgrass
Pine Run,	Jos. Lynn & Co.
Jefferson,	Foster, Clark & Wood.
.....	Robbins & Jenlins.
.....	Gumbert & Huey
Lovedale,	Wood, Schrader & Co.
.....	Horne & Roberts.
Enterprise,	O'Niell & Co.
Lower Road,	Walton & Co.
Upper Road,	Walton & Co.
Jones' Road,	G. & W. Jones.
Hilldale,	Blackburn & Mort.
New Eagle,	Lindsay & McCutcheon.
Wenone,	Skellon & Co.
Banner Works,	Gambie & Risher.

## IN WASHINGTON COUNTY.

Cincinnati,	J. S. Neil.
Huston,	J. B. Huston.
New Eagle,	Lindsay & McCutcheon.
Catsbird,	Harlem Coal Co.
Warne,	Hiram Warne.
Black Diamond,	Harlem Coal Co.
Hays' Mine,	A. Hays & Co.
Harlem,	Harlem Coal Co.
American,	F. H. Corson.
Woods' Run,	Thos. J. Woods.
Crow Mine,	Morgan & Dixon.
Caledonia,	Caledonia Coal Co.
Smith Mine,	Moore & Smith.
Dexter,	Crowthers & Musgrave.
.....	J. S. Neil.
Knob colliery,	Knob Coal Co.
Clipper,	Geo. W. Clark.
Stockdale,	Elizabeth Coal Co.
Shirecaks,	Blackburn & Mort.
Banner Works,	Gamble & Risher.
McChain,	Jacob Leglor.
Courtney,	Berry & Co.

## IN FAYETTE COUNTY.

Rutherford,	J. Rutherford.
.....	Turnbull & Hall.
Excelsior,	D. Bortner.
Merchant,	Coatsworth & Underwood.
Little Alps,	Coatsworth & Underwood.
Cedar Hill,	Morgan & Dixon.
.....	Joseph Garrow.
Cunningham,	A. & L. Abrams.

## SNOW SHOE REGION.

This region is located in Centre county, Pennsylvania. It covers an area of about eight miles in length, and some four miles in breadth, and is situated on both sides of Beach Creek. The coal finds an outlet to market, via the Bellefonte and Snow Shoe, and Bald Eagle Valley connections of the Pennsylvania Railroad. The distance from Snow Shoe to Tyrone, (on the main line,) is 47 miles. The production has never been very large, not aggregating 100,000 tons in any one year. The colliery at Snow Shoe, and the railway, were opened up in 1862, and have been operated by the Bellefonte and Snow Shoe Railroad Co. During January of this year (1881) the Pennsylvania Railroad Co., have secured the mines and railroad, by purchase, and we may look for a larger tonnage. We append details for ten years :

Year.	Tons.	Year.	Tons.
1871.....	79,984	1876.....	51,399
1872.....	68,988	1877.....	42,985
1873.....	95,257	1878.....	29,168
1874.....	63,540	1879.....	56,654
1875.....	62,426	1880.....	60,000

BROAD TOP SEMI-BITUMINOUS COAL FIELD.

An outlet for the coal from the region is afforded by the Huntingdon and Broad Top Mountain Railroad (this was completed in 1856, and during the latter part of that year 42,000 tons were forwarded from this region to various markets). The line extends from the town of Huntingdon, on the Pennsylvania Railroad, 203 miles west of Philadelphia, to Mt. Dallas, in Bedford county, a distance of 45 miles. At Saxton, 24 miles from Huntingdon, a branch road, 10 miles in length, extends to Broad Top City; at Riddlesburg, 5 miles beyond Saxton, is a branch into Fulton, 5 miles from the main road.

From Mt. Dallas the Bedford and Bridgeport Railroad, 38<sup>6-10</sup> miles in length, extends to the Maryland State line; from this point to Cumberland, Md., via the Cumberland and Pennsylvania Railroad is 7 miles. This connection gives an outlet for the Cumberland coal to the interior markets of Pennsylvania, to Philadelphia and South Amboy, N. J. The Bedford and Bridgeport road is leased to the Pennsylvania Railroad, and operated by them.

We append details of the tonnage of the Huntingdon and Broad Top road, during the past ten years.

1871.....	319,625 tons.	1876.....	159,779 tons.
1872.....	297,473 tons.	1877.....	140,143 tons.
1873.....	350,245 tons.	1878.....	150,224 tons.
1874.....	226,633 tons.	1879.....	141,594 tons.
1875.....	204,921 tons.	1880.....	174,736 tons.

The shipments of Cumberland coal over the Pennsylvania State line, and Huntingdon & Broad Top Railroad, have been as below:—

1872.....	22,021 tons.	1877.....	187,488 tons.
1873.....	114,589 tons.	1878.....	163,598 tons.
1874.....	67,671 tons.	1879.....	171,930 tons.
1875.....	175,154 tons.	1880.....	242,593 tons.
1876.....	145,796 tons.		

The East Broad Top Railroad penetrated this coal field in 1875; the tonnage is about 100,000 tons per annum, of which there has been delivered to the Pennsylvania R. R. at Mt. Union, 53,567 tons of coal during 1875, 66,104 in 1876, 54,738 in 1877, 63,068 in 1878, 67,929 in 1879, and 72,450 in 1880. In addition, some 43,946 tons were last year used in the furnaces, on the line of the E. B. T. road.

The coal measures are regular in structure, with gentle undulations dividing the field into several synclinals or basins. The coal is semi-Bituminous in its nature, and has been largely used for blacksmithing purposes, for generating steam in locomotives, marine and stationary engines, in rolling mills, puddling furnaces and forge fires; with glass works it is an especial favorite. It gives a white ash, is free burning, and easily ignited.

Included in this region, are all the mines in Huntingdon and Bedford counties. We append a list of the collieries, and the operators:—

Lane, Nos. 1 & 2,	Sandy Run Coal Co.	Howe,	W. H. Sweet & Co.
Mt. Equity, Nos. 1 & 2,	Kemble Coal & Iron Co.	Ocean,	W. H. Sweet & Co.
Cunard,	R. B. Wigton.	Cumberland,	H. K. Grant.
Rommel,	R. Maher.	Powelton,	R. H. Powell & Co.
Anderson,	Jenkins & Co.	Robertsdale,	Rockhill Iron & Coal Co.
Defiance,	A. Covalt & Co.	Howe mine,	Wm. H. Sweet & Co.
Duval Shaft,	Mears Bros.	Mooredale,	Reakirt Bro. & Co.
Carbon,	Mears Bros.	Fisher,	Wm. H. Sweet & Co.
Mooredale,	Reakirt Bro. & Co.	Carbon,	Mears Bros.
Fishers,	W. H. Sweet & Co.	Powelton,	R. H. Powell & Co.

## CLEARFIELD REGION.

This coal field is located in Clearfield and Centre counties, in the central portion of the State of Pennsylvania; for an outlet for the product of its mines it is dependent upon the Tyrone and Clearfield branch of the Pennsylvania Railroad, extending from Tyrone, on the main line (224 miles west from Philadelphia), to Clearfield, 41 miles. The Pennsylvania Railroad Company own the railroads, the shipping wharves, and all the means of access to the markets of the Atlantic seaboard; the advantage of being connected with a railroad of such magnitude, with its wonderful ramifications and connections, gives the coal proprietors of this region great facilities for the proper conduct of their business, and it is owing to the very liberal policy of this corporation, that the district has been enabled to take the rank which it has assumed, in connection with the fuel supply of the seaboard. The figures given of the production, show that the demand for this quality of coal has steadily increased. Statistics of the product from the beginning are as below, in tons of 2,000 lbs.:—

1867.....	169,219 tons.	1874.....	639,630 tons.
1868.....	171,238 tons.	1875.....	928,297 tons.
1869.....	259,994 tons.	1876.....	1,281,861 tons.
1870.....	379,863 tons.	1877.....	1,374,927 tons.
1871.....	542,896 tons.	1878.....	1,295,201 tons.
1872.....	431,915 tons.	1879.....	1,631,120 tons.
1873.....	592,860 tons.	1880.....	1,739,873 tons.

The report of the Geological Survey, gives the coal of this region an exceptional character for purity and freedom from sulphur. The coal is used for steam purposes under stationary, marine, or locomotive engines, for making iron and steam rails, for glass works, in lime kilns, and many other purposes, being much liked wherever used; ignites freely, burns readily, and leaves a white ash. It is not easily friable, and bears transportation remarkably well. The analysis of Clearfield coal shows an average of about 70 per cent. carbon, and 22 per cent. volatile matter, leaving eight per cent. water, sulphur and ash. The highest percentage of carbon, as per table of analyses made by Geological Survey, is 74.284, found by analysis of Franklin coal.

During the past season of 1880, the tonnage from this region was larger than heretofore, and it would have reached at least two millions of tons, had it not been for a long and tedious strike that took place in the spring, just when the most active period of trade was beginning. The operators spent nearly eleven weeks, and considerable money in putting down this strike, as it was unjust, and they were successful. Wages are fifty cents per ton, and full work is the rule at the better class of collieries. Many extensive mines are being opened up in this coal region, and the output will be largely increased during 1881, if there is anything like the car service that is required. We quote as a fair rate for this coal last year: \$3.75 at Philadelphia, and \$4.50 at South Amboy. The trade is increasing largely at tide-water. Transportation last year was higher than before, and we are informed ranged at \$3.56 per gross ton to South Amboy from Houtzdale, and \$2.72 to Philadelphia, for shipment. We append a list of the

collieries in this region, with their owners, and the location. The tonnage of each concern cannot be had with any degree of accuracy either from the operators or the railroads.

<i>Name of Mines.</i>	<i>Location.</i>	<i>Operators.</i>
Eureka,	Houtzdale,	Berwind, White & Co.
Eureka No. 2,	Houtzdale,	Berwind, White & Co.
Goss Run,	Goss Run,	Berwind, White & Co.
Mapleton,	Mapleton,	Berwind, White & Co.
Franklin,	Houtzdale,	Kittaning Coal Co.
Beaver,	Houtzdale,	Kittaning Coal Co.
Philadelphia,	Houtzdale,	Kittaning Coal Co.
Ocean,	Goss Run,	J. Whitehead & Co.
Excelsior,	Goss Run,	Fisher Bros. & Miller.
Beaver Run,	Beaver Run,	Beaver Run Coal Co.
Logan,	Laurel Run,	H. J. Smith & Co.
Sterling,	Sterling,	R. H. Powel & Co.
Sterling No. 2,	Sterling,	R. H. Powel & Co.
Webster,	Goss Run,	J. C. Scott & Son.
Moshannon,	Sobieski,	Moshannon Coal Co.
Moshannon No. 2,	Beaver Run,	Moshannon Coal Co.
Morrisdale,	Morrisdale,	R. B. Wigton & Sons.
Laurel Run,	Laurel Run,	Nuttall & Bacon.
Penn mines,	Houtzdale,	Reakirt Bros. & Co.
Reading,	Osceola Mills,	H. Liveright.
Leskie colliery,	near Osceola Mills,	J. E. Leskie & Co.
Black Diamond,	Powelton,	W. J. Jackson.
Glenwood,	Glenwood,	Campbell Bros.
Derby,	Philipsburg,	Thos. Barnes.
Cuba,	Philipsburg,	J. Ashcroft & Co.
Lancashire,	Philipsburg,	C. Tucker & Co.
Reliance,	Osceola Mills,	.....
Decatur,	Decatur,	J. Nuttall & Co.
Colorado,	Philipsburg,	A. & W. H. Barlow & Co.
Cody Ridge,	Philipsburg,	Jas. Grant.
Atlantic,	Beaver Run,	John Whitehead & Co.
Pacific,	Goss Run,	John Whitehead & Co.
Coal Run	Taylor's Siding,	W. J. Jackson.
Victor,	Philipsburg,	Victor Coal Co.

Shipments are made by lateral roads to the Tyrone and Clearfield branch of Pennsylvania Railroad, which joins the main line at Tyrone.

### MYERSDALE REGION.

The following is a list of the operations in this region with the names of the operators.

Cumberland & Elk Lick,	Shaw, Chamberlain & Co.	.....	James Cochran.
Cumberland,	John Williams.	.....	W. J. Smith & Co.
Keystone,	Keystone Coal Co.	Balt. and Cumberland,	Balt. & Cumb. C. Co.
Myersdale,	Hocking Bros.	Casselmann,	Hoffman, Johnson & Co.
New Central,	{ Hoblitzell, Hyndmann	.....	Samuel Adams.
	& Co.	Philson Iron Coal Co.,	S. Philson & Sons.
Salisbury,	John Williams.	Berlin,	Reese & Co.

This region is located in Somerset County, Pennsylvania, and embraces the old Salisbury coal-field, the Buffalo Valley coal-field, and the Blue Lick field. Myersdale is the headquarters for all the operators. The coal is stated to be similar to, and extension of, the Georges Creek (Cumberland) basin, which adjoins it on the south,



in the State of Maryland. The centre of the basin is thirty-eight miles distant from Cumberland, Md., and the coal finds an outlet to Baltimore and the seaboard markets, via the Pittsburgh, Washington & Baltimore Railroad (the Baltimore and Ohio). The proposed extension of the Pennsylvania Railroad via Deiters Gap, would also serve this region with an additional outlet to market. The coal is awarded a high position in the Geological Survey report, which states: "In general character the coal from the Pittsburgh bed in the Salisbury basin resembles the coal coming from the same bed in the Cumberland basin. The similarity is sufficiently great to render it sure that for all steam-raising purposes it should take a high rank. The percentage of sulphur runs very low on the average; and the coal is an efficient and clean fuel for puddling furnaces and rolling mills." An analysis made by the Chemist of the Survey shows, 1.665 water; 22.350 volatile matter; 68.774 fixed carbon; 1.246 sulphur; ash 5.965. Coke, per cent., 75.985. Color of ash, gray, with pink tinge.

The Keystone Coal Co. have been at work in this district since 1872, and last year did a tonnage of 53,858 tons. The Cumberland and Elk Lick Co. mined 65,949 tons. The Baltimore and Cumberland Coal Co. 47,810. The business is gradually but surely growing to good proportions, as the total last year was 187,660 tons, as against 176,126 tons during the year 1879, from the whole region, and this would have shown a still greater increase, but for labor troubles during the latter part of the year. The coal from this district goes to the same markets as the Georges Creek coal, and with proper railway facilities there could be more of an output.

### WEST BRANCH REGION.

We include in this region the several collieries located in Cameron and Elk counties, Pa., along the line of the Philadelphia and Erie Railroad. They are as below:—

<i>Collieries.</i>	<i>Location.</i>	<i>Operators.</i>	<i>Tons, 1879.</i>	<i>Tons, 1880.</i>
St. Marys mines,	St. Marys,	St. Marys Coal Co.,	87,169	85,000
Cascade mines,	St. Marys,	Hall & Kaul,	15,000	20,000
Daguschahonda mines,	Dagus City,	{ Northwestern Mining } { & Exchange Co. }	97,204	161,885
Glen Mayo mines,	Wilmarth,	J. H. Mayo & Co.,	20,000	10,000
Eureka mines,	Kersey,	D. Eldridge,	13,672	49,500
Silver Creek,	(Abandoned,)	D. Eldridge,	18,477	Idle.
Cameron mines,	Cameron,	Cameron Coal Co.,	42,000	50,000

Outlet to market is via Philadelphia and Erie; and the Buffalo, New York and Philadelphia Railroads.

The coal from the Northwestern M. & E. Co., goes to the 'Erie' railway for supply coal. The Cameron is developing its property, and expects to do a largely increased tonnage during 1881; their mines are only 125 miles distant from Buffalo, and are only 320 miles from New York. This company is in stronger hands than before, and they report ability to produce six hundred tons a day this year, and the outlook for the coal trade being much better, may give them the opportunity to do so.

## THE CONNELLSVILLE COKE REGION.

Beyond peradventure the coking coal of the United States, which enjoys the most enviable reputation, is the Connellsville. It is situated in the southwestern part of the State of Pennsylvania, lying mainly in the counties of Westmoreland and Fayette, and distant some 50 to 60 miles from Pittsburgh. The coal basin is fifty miles in length, by about three miles in width; and the coal seam is from eight to nine and a half feet in thickness. The operations carried on are large and powerful in every sense of the term. The amount of capital invested here is something enormous, and the five thousand ovens, now in full work, will soon be augmented. As the coal is thus being turned into coke, and the contents of acres of the seam used up annually, the commodity must increase in intrinsic value, at the ovens.

The coal is Bituminous, with generally a dull resinous lustre, alternating with seams of bright, shining crystalline coal, coated with a yellowish silt. It contains numerous particles of slate, and some crystals of pyrites. It is compact, with a tendency to break up into cubes. One of the latest analyses that we have of this coal, shows—fixed carbon, 64.18; vol. matter, 28.50, ash, 6.12; sulphur, 0.6; moisture, 1.20. Coke, 70.30.

The coke from this region is of silvery lustre, cellular, with a metallic ring, tenacious, comparatively free from impurities, and capable of bearing a heavy burden in the furnace. Its porosity and ability to "stand up" in the furnace are what have given it such a reputation for a blast furnace fuel, and created such demand for it for mixing with Anthracite and Bituminous coal in the East and West, especially where an open iron, such as is used in the Bessemer process, is needed.

In coking the coal, the beehive oven is in universal use in the Connellsville region. These ovens vary, at the different works, from 11 to 12 feet in diameter, and from 5 to 6 feet in height. The working is very simple. The coal is dumped through an opening in the crown of the furnace, and spread evenly on the floor, to the average depth of 2 feet for 48-hour coke, and  $2\frac{1}{2}$  feet for 72-hour. The front opening, through which the coke is discharged, is at first nearly closed with brick, luted with loam. The heat of the oven from the previous coking fires the charge, and as the coking progresses, the air is more and more shut off by luting the openings, and finally closing the roof openings. The average charge is 100 bushels of coal at 76 lbs., and the yield in coke, 120 bushels at 40 lbs., making the percentage yield 63, or 1.6 tons of coal to 1 ton of coke. The average time of coking is 48-hours, with 72-hours for that burned over Sunday; 24-hour coke is sometimes made. The 72-hour coke is firmer coke than either of the others, but it is questionable whether it is a better furnace coke. When the coke is thoroughly burned the door is removed, and the coke is cooled by water thrown in from a hose, and then drawn.

During the entire year of 1879, the price of Connellsville coke, at the ovens, did not fluctuate more than 15 @ 25 cents per net ton, from the beginning to the end of the year. At the opening of the year 1880, the price was quoted at \$1.50 per ton; advanced in January to \$2.75; sold during February, March and April, at \$3.25 @ \$4.00; May it fell off, closing at \$2.25; since then to the close of the year, rates ranged at \$1.50 @ \$1.75. These are figures for good round lots; for small, transient orders, we believe some coke was sold at over \$5.00 at the ovens, during the boom, which culminated in March. The production of coke in this region will foot up to something like two and a half million tons per annum.

<i>Location.</i>	<i>Name of Works.</i>	<i>Owners.</i>	<i>No. Ovens.</i>
<b>PITTSBURGH DIVISION.</b>			
Saltsburgh,	.....	W. H. Brown & Co.	20
Alpsville,	.....	Patrick Connelly,	24
Shaner,	.....	Yough Coal Hollow C. Co.	20
Scott Haven,	.....	W. L. Scott & Co.,	30
Smithton,	Waverly,	Waverly Coal & Coke Co.,	100
Fayette,	Fayette,	Cochran & Co.,	101
Jackson,	Jackson mines,	Jackson Mine Co.,	63
Sedgwick,	Tyrone mines,	Laughlin & Co.,	116
Sedgwick,	Sterling,	Brown & Cochran,	169
Washington,	Washington,	Cochran, Son & Co.,	35
Connellsville,	Pgh. & Con. Gas C. & C. Co.	J. F. Dravo & Co.,	253 921
<b>HICKMAN RUN BRANCH.</b>			
Spring Grove,	Spring Grove,	Cochran & Keister,	100
Jimtown,	.....	Brown & Co.,	304
.....	.....	J. S. Newmeyer & Son,	25 429
<b>MT. PLEASANT BRANCH.</b>			
Broad Ford,	Henry Clay,	H. C. Frick & Co.,	100
Broad Ford,	Novelty,	H. C. Frick & Co.,	100
Morgan,	Morgan,	H. C. Frick & Co.,	164
Morgan,	Globe,	Hutchinson & Bro.,	148
Morgan,	Foundry,	H. C. Frick & Co.,	74
Morgan,	Eagle mines,	H. C. Frick & Co.,	80
Summit,	Summit,	H. C. Frick & Co.,	142
Tinsman,	Franklin,	Cochran & Keister,	40
Tinsman,	Tip Top,	H. C. Frick & Co.,	56
Clinton,	Clinton,	James Cochran & Co.,	44
Valley,	Valley,	H. C. Frick & Co.,	153
Everson,	Fountain,	W. H. Blake,	50
West Overton,	Dexter mines,	J. R. Stauffer & Co.,	40
Overton,	Painters,	McClure & Co.,	156
Overton,	Diamond mines,	John Lane & Co.,	30
Buckeye,	Buckeye,	John M. Cochran,	120
Stauffer,	.....	B. F. Coughenour & Co.,	20
Mullen,	.....	McClure, Boyle & Hazlett,	263
Mullen,	.....	W. D. Mullen,	80
Mt. Pleasant,	Standard,	H. C. Frick & Co.,	164 2,024
<b>WEST YOUGH BRANCH.</b>			
	.....	Cleveland Rolling Mill Co.,	30
<b>FAYETTE CO. BRANCH.</b>			
Wheeler (S. W. Pa. Sta.)	Con. G. C. Co.,	Cambria Iron Co.,	590
Watts,	.....	Reid Bros.,	76
Watts,	Anchor,	Henderson Bros.,	100
Watts,	Mahoning Coke Works,	Youngstown Iron Co.,	100
Dunbar,	.....	Dunbar Furnace Co.,	89
Ferguson,	.....	Dunbar Furnace Co.,	80
Mt. Braddock,	.....	Hogsett & Co.,	127
Percy,	.....	Percy Mining Co.,	62
Youngstown,	.....	Youngstown Coke Co.,	240
Lemont,	.....	Lemont Furnace Co.,	120
Evans,	.....	Stewart Iron Co.,	89 1,583
<b>S. W. PA. B. R.</b>			
Moyers,	.....	Chicago & Con. Coke Co.,	106
Pennville,	Cleveland,	Cleveland Coke Co.,	120
Valley,	Sherricks,	A. H. Sherrick & Co.,	70
Hawkeye,	Home,	J. Sherrick & Co.,	20
Stonerville,	Enterprise,	Enterprise Coke Co.,	51
Stonerville,	Union,	Hurst, Stoner & Co.,	70
Stonerville,	American,	Saml. Warden & Co.,	70
½ M. East Tars Sta.	.....	Dillinger & Tars,	64
Tars,	S. W. Coal Co.,	S. W. Coal Co.,	60 631
<b>S. W. PA. B. R. BRANCHES.</b>			
Morrell,	Morrell,	Cambria Iron Co.,	400
.....	Leisenring,	Connellsville Coke & I. Co.,	200
.....	Trotter,	Connellsville Gas Coal Co.,	100
Overton,	.....	A. O. Overholt & Co.	120
June Bug,	Emma mines,	J. F. Overholt,	36
June Bug,	Rising Sun,	Markle & Co.,	79
June Bug,	Bessemer,	Markle & Son,	170
June Bug,	Alice mines,	J. M. Schoonmaker,	100
June Bug,	Morewood "B.,"	H. C. Frick & Co.,	300
June Bug,	Morewood "A.,"	H. C. Frick & Co.,	100
Jacobs Creek,	.....	Fox, Keifer & Co.,	18 1,623

## WEST VIRGINIA GAS COAL.

That quality of coal known in the New York and Eastern markets as "West Virginia Gas Coal" is mined in Marion, Taylor, Ritchie and Preston counties, West Virginia, the mines being located near to or upon the main line of the Baltimore and Ohio railway. The coal is used for gas making in the cities of the seaboard, and is very favorably spoken of. The distances to Baltimore are as follows: From Clarksburg, 301 miles; from Fairmount, 302 miles; from Newburg, 263 miles; from Tunnelton, 260 miles; from Cairo, 355 miles. The veins are from six to eleven feet in thickness. Analyses of these coals have given the following results:

	<i>Volatile matter.</i>	<i>Fixed carbon.</i>	<i>Ash.</i>
Clarksburg, main seam.....	56.74	41.66	1.60
Clarksburg Cannel.....	49.21	45.43	5.36

Professor Doremus' analysis of the Montauk coal which is mined at Flemington, Taylor county, was as below:

Carbon.....	80.8200	Moisture.....	1.0500
Hydrogen.....	5.5200	Ash.....	3.8400
Oxygen and nitrogen.....	8.4706	Sulphur.....	0.2994

The business of the district is stated to be about four hundred thousand tons. In addition to the outlet eastward via Baltimore and Ohio Railroad, there is the Parkersburg route due west, crossing the Monongahela river at Clarksburg, and thence to the Ohio river at Parkersburg; and the Wheeling route north westward, crossing the Monongahela at Fairmount, thence down the creek to the Ohio, and thence up the river to Wheeling. Both these branches enter the main coal measures near the crossing of the Monongahela above named, and traverse them to the Ohio. At Clarksburg and northward, down the Valley of the Monongahela, is one of the richest coal regions of West Virginia. One of the beds in the neighborhood of this town measures from ten to twelve feet in thickness, with a thinner bed of more highly Bituminous nature underlying; from some distance above Clarksburg, they may be followed with scarcely an interruption throughout the whole Valley of the Monongahela, northward to Pittsburgh.

We are again without the statistics of shipments to Baltimore, but our estimate is a fair one.

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1868.....	165,772	1875.....	177,316
1869.....	269,158	1876.....	127,293
1870.....	249,879	1877.....	103,035
1871.....	189,763	1878.....	140,000
1872.....	217,569	1879.....	165,000
1873.....	190,673	1880.....	210,000
1874.....	131,703		

The coal from this region should take a large portion of the trade, and with the fostering care of the Baltimore and Ohio road, we may look for a large increase in the tonnage. The coal compares very favorably with the best gas coals from other sources. The large quantity of hydrogen shows that it must yield large volumes of gas, while the small quantity of sulphur is especially noticeable. Gas made per gross ton is stated at 12,839 cubic feet of 16 candle illuminating power; coke  $37\frac{1}{2}$  bushels of 45 lbs. We should judge that there is not much prospect of a diminution in the use of coal gas, as it has special advantages for purposes outside of illumination.



## THE KANAWHA (W. VA.) REGION.

The coal measures of West Virginia underlay nearly sixteen thousand square miles of territory, of which, what are known as the Kanawha and New River Valleys, traversed by the Chesapeake and Ohio Railroad, hold eight thousand. Several varieties of coal occur, among which are:—Cannel, Splint, Gas and Bituminous. Of the Bituminous there are seams of different degrees of hardness or texture, from the friable coking coal similar to the best Newcastle (England) coals, to the harder Splint coals, with regular cleavage similar to the Youghiogheny coals so largely in demand in our Western and Southern cities; of so compact a nature that it can be used in the blast furnace in its raw state. The Bituminous coals are excellent steam raising fuels, and have been used on steamers, railways, and under stationary engines with good results. The Gas coal seam is productive of a most excellent quality of coal that has been used in both the Eastern and Western markets with most satisfactory results.

The value and importance of the Kanawha coal district, as a source of supply from which good caking coals can be obtained, is beginning to be understood and appreciated by gas manufacturers. These coal have established a high reputation where they have been tested and used, for the quantity, purity and illuminating power of the gas which they produce. We have the following comparative details for 1878-80:—

<i>Distribution.</i>	<i>Tons, 1878.</i>	<i>Tons, 1879.</i>	<i>Tons, 1880.</i>
For use of C. & O. Railway Company.....	78,250	83,916	122,237
On line of road west of Richmond.....	28,187	29,650	57,598
At Huntington for shipment on Ohio river.....	10,673	77,662	105,399
To connecting railroads.....	34,453	33,103	57,358
At Richmond for consumption.....	50,004	52,976	47,043
At James river wharves for shipment.....	140,921	174,526	216,809
Total coal mined and carried.....	342,480	451,823	606,444

The appended analyses of the coals mined and coke made, along the New River and Kanawha Valleys will repay perusal.

<i>Of the Coals.</i>	<i>Cannel.</i>	<i>Gas Coal.</i>	<i>Quinnimont.</i>	<i>Nuttallburg.</i>
Fixed Carbon.....	23.50	56.65	75.89	70.67
Volatile matter.....	58.00	1.75	18.19	25.35
Moisture.....		1.08	0.74	1.35
Ash.....	18.50	5.18	4.98	2.10
Sulphur.....		1.32	....	0.57
<i>Of the Cokes.</i>	<i>Sewell.</i>	<i>Nuttallburg.</i>	<i>Quinnimont.</i>	<i>Quinnimont.</i>
			No. 1.	No. 2.
Fixed carbon .....	93.00	91.22	93.85	91.72
Ash.....	6.73	7.53	5.85	5.09
Sulphur.....	0.27	0.92	0.30	0.48

Of the fuel mined, there was an increase of 9,819 tons or 29%, of Splint and Bituminous 131,481 tons or 33%, and of coke 13,311 tons or 57%. Coke made and consumed along the line was fully fifty thousand tons during last year. The large increase in the item "delivered on line" was due to the demand for fuel for the furnaces put in blast during the year. The completion of the Chesapeake and Ohio Railroad to Hampton, will no doubt add to the amount of coal carried over this line, for they would then be so much nearer to points of consumption, that there could be no fear of competition; the charges on the railroad from the mines to tide being reduced to a fair and equitable rate. Shipments west are increasing, and there is also a chance to grow, in that direction.

## FIRST BITUMINOUS COAL DISTRICT.

This is by far the most important coal producing district in the United States. The mine inspector, Mr. William Wilcox, writes us that from returns furnished him from 135 mines, he is enabled to make the following estimate for 1880 :

Estimated number of miners in the district.....	18,172
Estimated number of outside hands.....	5,192
Total number of persons employed, estimated.....	23,364
Estimated number of hands employed in 1879.....	18,120
Increased number of hands employed over 1879.....	5,244
Number of mines in the district.....	260
Number operated in 1880.....	236
Estimated number of tons of coal produced.....	12,158,248
Estimated number of tons produced in 1879.....	10,044,926
Increase for 1880, in tons.....	2,113,322
Number of new mines opened in 1880.....	23
Number of mines manufacturing coke.....	81
Number of new mines about to commence mining.....	10
Number of lives lost in 1879.....	36
Number of lives lost in 1880.....	28
Amount of coal produced per life lost in 1873 (tons)....	297,902
“ “ “ “ in 1879 (tons).....	279,026
“ “ “ “ in 1880 (tons).....	434,223
Number of persons employed per life lost in 1878.....	563
“ “ “ “ in 1879.....	503
“ “ “ “ in 1880.....	834
Number of deaths from falls in the mines in 1878.....	25
“ “ “ “ in 1879.....	24
“ “ “ “ in 1880.....	20
Average output per mine, in tons, in 1879.....	46,504
Average output per mine, in tons, in 1880.....	51,618
Average price paid for mining per ton in 1879 (cents).....	49.51
Average price paid for mining per ton in 1880 (cents).....	57.22
Average amount earned by each miner in 1879.....	\$337.07
Average amount earned by each miner in 1880.....	\$382.82
Average number of employees at each mine in 1880.....	99
Average number of days worked at each mine.....	188
Average output in tons per miner per year.....	669
Average output per miner per day in tons.....	3.56

The above forms a part of the annual report of Mr. Wilcox to the Governor of Pennsylvania. It will be noticed there has been an increase in the number of persons employed during the year, of 5,244, and according to estimate an increase in the coal production amounting to 2,113,322 tons: these figures are reliable, not being overdrawn in the least. The most gratifying part of this is that with this large increase in numbers employed, and the great increase in the output, the number of deaths has been reduced by eight. We have good reason to be both proud and thankful for the above results; and for the careful supervision over the mines in his district, Mr. Wilcox is entitled to great credit from both operators and miners. With the increased number of mines opening up in this district, there is no possibility of the future output being less than it was during the last year, for the mines now opening are large and first-class in every particular. The railway facilities for distributing the coal throughout the West are also improving. Connellsville coking coal must show an increase during 1881, and the Monongahela mines ought to do more than they have done. Within the area comprised in this mining district there are more men employed and coal produced than in the other portions of the State, where Bituminous coal is produced.

This district includes the mines in Allegheny, Bedford, Fayette, Somerset, Washington and Westmoreland counties. We give details regarding the business of the

collieries on the Monongahela on page 23; those in Somerset county on page 27; the Westmoreland on page 22, and append details regarding the others.

## ALLEGHENY COUNTY.

Imperial (two mines), Imperial Coal Co.

Ship by branch road to Montour Junction on Pittsburgh and Lake Erie Railroad.

Glendale,	S. B. Gregg.
Nixon,	Chartiers Valley Coal Co.
Black Diamond,	—McCausland.
Summer Hill,	Frank Armstrong.
Boyer Hill,	A. J. Shulte.
Chartiers gas coal,	James Clark.
Allison mine,	J. Allison.
Enterprise,	V. Harding.

Ship via Chartiers Valley Railroad.

Sandy Creek No. 1,	{ N. Y. & Cleveland Gas
Sandy Creek No. 2,	{ Coal Co.
Union Works,	M. Graver & Co.
Plum Creek No. 1,	{ N. Y. & Cleveland Gas
Plum Creek No. 2,	{ Coal Co.

Ship via Allegheny Valley Railroad.

Three collieries,	Gray & Bell.
Enterprise,	Hartley & Marshall.
.....	John Carlin & Co.

Ship via Little Saw-Mill Run Railway, thence by river, and Pittsburgh and Lake Erie road.

Bells Mills,	{ Mansfield Coal and Coke
Grant mine,	{ Works.
Keystone,	J. Jones & Co.
Camp Hill,	Keystone Coal Co.
.....	D. Steen & Sons.
Pittsburgh Union	Jas. Ewing & Co.
Fort Pitt mines,	Jos. McConnell.
Block mine,	Fort Pitt Coal Co.
Cherry mine,	J. W. Crawford.
Oak Ridge,	Morris McCue.
National,	Oak Ridge Coal Co.
Laurel Hill,	Pittsburgh Nat'l C. Co.
Mansfield,	W. P. Rend & Co.
	Phenix Gas Coal Co.

Located upon and shipments made via Pittsburgh, Cincinnati and St. Louis railway.

Duquesne,	{ N. Y. & Cleveland Gas
Oak Hill No. 3,	{ Coal Co.
Oak Hill No. 4,	
Corey's,	J. B. Corey & Co.
Hampton mines,	John McIntyre.

Located upon main line of Pennsylvania Railroad.

Fair Haven mine, P. & C. S. R. R. Co.

Ship via Pittsburgh and Castle Shannon Railroad.

Wood mine,	Wettingel & Gormley.
Nimick mine,	Thomas Fox.

Ship over local township roads to Pittsburgh city.

Penney mine,	Lynch & Robinson.
Youghiogheny mine,	James O'Neil.
Cornell Werlings,	W. H. Brown's heirs.

Located on Youghiogheny river; shipped by same.

## FAYETTE COUNTY.

Drift mine,	Rainey & Co.
Spring Grove,	Cochran & Kaster.
Sterling, Nos. 2 and 3,	Brown & Cochran.
Fayette,	James Cochran.
Jackson,	Jackson Mine Co.
Tyrone mine,	Laughlin & Co.
Cochran's,	Cochran Bros.
New Shaft,	H. C. Frick & Co.
Henry Clay,	H. C. Frick & Co.

Ship via Pittsburgh, Washington and Baltimore Railroad and connections.

Wickham,	Cambria Iron Co.
Morrell mine,	Cambria Iron Co.
Uniondale,	J. M. Reid.
Anchor mine,	H. C. Frick & Co.
Deer Park,	Mahoning Coal Co.
Hill Farm,	Dunbar Furnace Co.
Furnace mine,	H. C. Frick & Co.
Mt. Braddock,	Hogsett, Watt & Co.
New Shaft,	{ Youngstown Coke Co.,
	{ limited.
Lemont,	Hogsett, Hanna & Co.
Connellsville,	H. C. Frick & Co.
Eldorado,	Zuck & Henry.
Pennsville,	A. H. Sherrick.
Ferguson slope,	Dunbar Furnace Co.
Fros mines,	Persey Mining Co.
Coke works,	C. H. Armstrong & Son.
Milnesville,	Rob't Jenkins.

Ship via South-West Pennsylvania Railroad to Pennsylvania Railroad; main line at Greensburg.

Novelty,	{ H. C. Frick & Co.
Morgan Nos. 1 and 2,	{
Red Hot,	{ H. C. Frick & Co.
Globe mines,	{ H. C. Frick & Co.
Eagle,	{
Lip Top,	{ H. C. Frick & Co.
Valley,	{
Summit mines,	James Cochran.
Dexter,	J. R. Stauffer.
Painter mines,	Gil Rafferty & Co.
Millers,	James Mullen.
Cochran Nos. 1 and 2,	James Cochran.
Franklin,	B. F. Kester & Co.
Trotter,	Connellsville Gas C. Co.
Leisenring,	Connellsville Coke & I. Co.
New Shaft,	Connellsville C'l & C'e Co.
New Shaft,	{ Connellsville & Chicago
	{ Coke Co.

Ship via Mt. Pleasant branch, to Pittsburgh, Washington and Baltimore Railroad, at Mt. Pleasant.

## WASHINGTON COUNTY.

Brier Hill,	J. D. SanTERS.
Primrose,	T. B. Robbins & Co.
Walnut Hill No. 2,	T. B. Robbins & Co.
Willow Grove,	T. B. Robbins & Co.
Block mine,	J. W. Crawford.
Cliff mine,	Scully & Co.
Coal Bluff,	Patterson & Co.
Buffalo,	Chicago Gas Coal Co.
Byers,	J. Loutitt & Co.
Banner Works,	Gamble & Risher.

Ship via Pittsburgh, Virginia and Charleston Railroad and connections.



THE SECOND BITUMINOUS COAL DISTRICT.

This district includes the mines in Allegheny county (on line of West Penna. road), and Armstrong, Beaver, Butler, Clarion, Jefferson, Lawrence, Mercer and Venango counties, and is under the charge of John J. Davis, Mine Inspector. We give the Reynoldsville (Jefferson) mines, a special notice on page 20. Herewith is found a list of the other mines, and the operators in this district, and the outlets to market. The gross output for 1880, is stated at 2,000,000 tons.

ALLEGHENY COUNTY.

Natrona mine,	Penna. Salt M'fg Co.
Bellevue,	P. Y. Hite.
Hite No. 2,	P. Y. Hite.

On the West Penna. Railroad, and ship over that road and its connections. That from Natrona is used by the company.

ARMSTRONG COUNTY.

Stewardson Furnace mine,	F. B. & A. Laughlin.
Rimerton Coal Works,	Rimerton Coal Co.
Mahoning Coal Works,	Mahoning Coal Co.
Mahoning Furnace mine,	Wesley, Wilson & Co.
Pine Creek Furnace mine,	Brown & Mosgrove.
Kittanning mine,	Kittanning Iron Co.
New Bethlehem,	Sandy Lick Coal Co.

Rimerton ships over Allegheny Valley Railroad; Stewardson, Mahoning and Kittanning goes to mills and furnaces, near the mines; the Sandy Lick Coal Co. ship over low grade division of A. V. R. R.

BEAVER COUNTY.

Cannelton mine,	I. F. Mansfield.
Beaver Fall mine,	A. Davidson.
Beaver Block mine,	J. Sutherin.
Baker Bank,	L. S. Hoyt.

Cannelton and Beaver Block, on branches of P. Ft. W. & C. Railroad; Baker Bank on line of Erie & Pittsburgh, ship over these roads and connections; coal from the Beaver Fall mine is hauled by teams.

BUTLER COUNTY.

Karns City drift,	H. R. Fullerton.
Burnett mine,	A. Burnett.
Acborr Slope,	Acborr Mining Co.,
Barnes Mine,	Mercer Mining & M. Co.
Slageville mine,	Union Coke & Coal Co.

Karns city ships over P. K. and B. R. R., and the others over Shenango and Allegheny R. R. and connections.

CLARION COUNTY.

Red Bank Furnace mine,	Reynolds & Morehead.
Mineral Ridge,	T. J. Skidmore.
Sligo Branch,	Sligo Branch Coal Co.
Fairmount,	Fairmount Coal Co.
Catfish,	{ Pittsburgh Coal and
Lower Hillville,	{ Mining Co.
Fairmount No. 4,	Fairmount Coal Co.
Pine Run mine,	Stephenson & Mitchell.
Brady's Bend Mine,	Brady's Bend Coal Co.

CLARION COUNTY. (continued.)

Monterey,	John McCallum.
Clarion Mine,	Clarion Coal Co.

Coal from the first named, is used in the furnace; the others ship over Allegheny Valley Railroad, and connections.

LAWRENCE COUNTY.

Beaver mine,	Lee & Patterson.
Clinton mine,	Clinton Coal Co.
Davidson mine,	W. B. Enos & Co.
Walsh bank,	Wampum Furnace Co.
Wallace shaft,	Sharpless & Kincaid.
Shoaff mine,	Bay, Shoaff, Spears & Co.
Coal Center mine,	Neshannock Coal Co.

Coal from the first three is shipped over Erie and Pittsburgh Railroad and connections; the fourth is hauled by teams to New Castle, and that of the two last named, is used in New Castle mills, etc.

MERCER COUNTY.

Oakland Shaft, No. 3,	Oakland Coal Co.
Home Bank,	Buhl, Westernman & Co.
Hickory-mine,	Spearman & Co.
Bethel Shaft, No. 1,	Bethel Coal Co.
Pacific Slope,	Dunham, Roberts & Co.
Bethel Shaft, No. 3,	Curtis & Boyce Coal Co.
Pardoe mine,	Mercer Ming & M'fg Co.
Jackson mine,	Jackson Coal Co.
Stoneboro mine,	Mercer Iron & Coal Co.
Wheeler shaft,	Wheeler Iron Co.
Laird mine,	Thos. Laird.
Carbon Run mine,	Carbon Coal Co.
Wise shaft,	Snyder Coal Co.

The coal from the two Bethel shafts is sent in part over branch line to West Middlesex, for mill and furnace use; the coal from Pacific slope, Wheeler shaft and Laird, is hauled by teams, to mills and furnaces; that of Oakland, Home Bank, Hickory, Carbon Run and Wise shaft, goes to market over Sharpesville and Oakland Railroad, and connections; Pardoe goes over Shenango & Allegheny R. R.; Jackson over New Castle and Franklin R. R.; Stoneboro via L. S. & M. S. R. R.

VENANGO COUNTY.

McElhinney mine,	Tiel & McDowell.
Cranberry mine,	Cranberry Coal Co.
Maple Grove mine,	S. P. McCalmont.

Ship over Allegheny Valley Railroad and branches.

THE THIRD BITUMINOUS COAL DISTRICT.

This district includes the mines located in Bradford, Blair, Cambria, Centre, Clearfield, Cameron, Elk, Huntingdon, Lycoming, McKean and Tioga counties, and is under the charge of Wm. L. Richards, Mine Inspector. We have given the details of the business of the several districts, and need only add here that the aggregate output as therein given, foots up 5,235,000 tons for the year 1880.



## STATISTICS OF BITUMINOUS AND SEMI-BITUMINOUS COAL PRODUCTION OF PENNSYLVANIA, IN 1880.

IN TONS OF 2,000 lbs.	
Blossburg .....	1,021,555
Barclay .....	463,406
McIntyre .....	216,225
Total Northern Pennsylvania Region .....	1,701,186
Broad Top .....	174,736
East Broad Top .....	116,396
Snow Shoe .....	60,000
Clearfield .....	1,739,873
Total Central Pennsylvania region ..	2,091,005
Allegheny Mountain .....	307,125
West Pennsylvania Railroad .....	291,135
Southwest Pennsylvania Railroad .....	43,039
Westmoreland .....	943,177
Pittsburgh .....	561,548
Johnstown Iron Works .....	400,000
Add for coke (1,896,642 tons) as coal .....	3,034,617
Total West Pennsylvania region, on Penna. R. R. ....	5,580,641
Total of above .....	9,372,832

In addition to this, Somerset county, 200,000, McKean county, 150,000, and the western counties of the State, sufficient to make the sum total 19,000,000 tons, including coal for coking.

## COAL TRADE OF THE PENNSYLVANIA RAILROAD.

DISTRICT.	YEAR, 1880.	YEAR, 1879.
East Broad Top .....	68,788	66,376
Huntingdon and Broad Top .....	114,898	144,227
Snow Shoe .....	56,020	56,634
Tyrone and Clearfield .....	1,718,957	1,615,884
Gallitzin and Mountain region .....	307,125	213,636
“ “ “ coke .....	60,477	50,465
West Pennsylvania Railroad .....	291,135	217,156
“ “ “ coke .....	79,114	96,157
Southwest Pennsylvania Railroad .....	43,039	43,805
“ “ “ coke .....	1,149,389	921,860
Westmoreland region .....	943,177	816,302
“ “ “ coke .....	138,803	96,540
Pittsburgh region .....	561,548	568,309
“ “ “ coke .....	468,859	295,665

In addition to this, the Cumberland coal first carried by the H. & B. T. road 242,593 tons, and 1,248,527 tons of Anthracite. These details are from the regular report of coal and coke forwarded.

## ST. LOUIS, MO.

The coal tonnage of this city is increasing at a very rapid rate; taking coal and coke there was just twice as much received in 1880, as during the year 1872. By far the largest proportion of the Bituminous received at this city is by the Belleville and Southern Railroad from the Belleville district, in St. Clair county, Illinois. The principal seam worked is five to seven feet in thickness, and is economically mined. Analysis of this coal shows—water, 6; volatile matter, 38.8; fixed carbon, 52.2; ash, 5. The Iron Mountain Railroad brings the semi-Anthracite coal, known as the “Spadra,” from Arkansas, to this city.

Mr. Geo. H. Morgan sends us the following statement of the receipts of coal at St. Louis, for the year 1880, with a comparison from 1872:—

By Ohio and Mississippi Railroad.....	4,373,150 bushels.
By Indiana and St. Louis Railroad.....	1,138,225 bushels.
By St. Louis, Vandalia and T. H. Railroad.....	7,116,875 bushels.
By Belleville and Southern Railroad.....	8,798,800 bushels.
By Wabash Railroad.....	3,128,431 bushels.
By Louisville and Nashville Railroad.....	4,657,150 bushels.
By Illinois and St. Louis Railroad.....	5,911,225 bushels.
By Cairo and St. Louis Railroad.....	3,694,950 bushels.
From Ohio River, (Pittsburgh).....	1,639,875 bushels.
From St. Louis county—estimated.....	800,000 bushels.
By St. Louis, Alton and Chicago Railroad.....	372,350 bushels.
By St. Louis and Iron Mountain Railroad.....	80,200 bushels.
From Grand Tower.....	181,125 bushels.
Total.....	41,892,356 bushels.

Twenty-five bushels of eighty pounds each to the ton of 2,000 lbs.

The receipts of coke which is not in above account, in 1879, were 4,173,500 bushels, and 9,457,100 in 1880. A recapitulation of the coal trade is given below:

Year.	Bushels.	Year.	Bushels.
1872.....	24,557,425	1877.....	35,856,850
1873.....	32,608,795	1878.....	32,087,300
1874.....	29,823,050	1879.....	36,978,150
1875.....	32,466,650	1880.....	41,892,356
1876.....	32,073,125		

The quantity of Anthracite dealt in at this city, is stated to have been 40,000 tons during last year.

## PROVIDENCE, R. I.

The receipts of coal at this point, in tons of 2,240 lbs., in 1880, were 683,400 tons of all kinds. Details of receipts are as below:

Year.	Tons.	Year.	Tons.
1871.....	517,906	1876.....	610,339
1872.....	633,296	1877.....	645,311
1873.....	637,344	1878.....	576,168
1874.....	539,168	1879.....	742,199
1875.....	603,510	1880.....	683,400

## BALTIMORE, MD.

At this city there is an extensive business in coal, both Anthracite and Bituminous. Locust Point, the terminus of the Baltimore and Ohio Railroad, on the environs of this fine city, is the shipping point for the Bituminous coal from the Cumberland region of Maryland, the Gas coal regions of West Virginia, the Somerset county mines, and the Youghiogheny Gas coal of Pennsylvania.

The trade in Anthracite is entirely local, none being shipped from Baltimore to other and more distant points. It is received by the following named routes:—By Northern Central Railway from Millersburg, Pa., 112 miles, the Lykens Valley Red Ash. By the same route from Sunbury, Pa., 138 miles, the White Ash. By Susquehanna tide-water canal, coal from the Wyoming Valley. Schuylkill from Philadelphia, via river and canal. All the sales are 2,240 pounds to the ton.

The shipments of Bituminous coal, foreign, were as below :—

Year.	Tons.	Year.	Tons.
1872.....	54,363	1877.....	27,189
1873.....	59,546	1878.....	32,804
1874.....	70,675	1879.....	28,059
1875.....	33,460	1880.....	52,356
1876.....	27,336		

The Northern Central Railroad carried the following Anthracite :—

Year.	Tons.	Year.	Tons.
1872.....	244,757	1877.....	343,936
1873.....	242,754	1878.....	310,042
1874.....	232,938	1879.....	412,169
1875.....	276,784	1880.....	335,356
1876.....	263,954		

The Pennsylvania Railroad began carrying the Bituminous coal from the Clearfield region of Pennsylvania, to Baltimore, in 1875, by its Northern Central line, (to Canton,) and there has been considerable business for this quality of coal, developed in this vicinity.

The range in price of Cumberland coal at this port is as stated below :—

Year.	Prices.	Year.	Prices.	Year.	Prices.
1871.....	\$4.72	1875.....	\$4.42	1879.....	\$2.75
1872.....	4.66	1876.....	3.93	1880.....	3.75
1873.....	4.85	1877.....	3.34		
1874.....	4.63	1878.....	3.00		

The business in coal in 1880 was larger than during the preceding year. At the opening of the season Cumberland sold at \$3.25, and on and after March first, the Baltimore and Ohio tolls were advanced 56 cents per gross ton; this together with an advance of fifteen cents per ton in wages to the miners, and other advances in labor, took away the bulk of the difference between the prices of 1879, and those of 1880.

There was about 350,000 tons of Gas coal received, including that for shipment, and that for local use; this came from the West Virginia mines, along the Baltimore and Ohio and from the Youghiogheny mines, in Penna., via Baltimore and Ohio Railroad.

The total coal tonnage of the Baltimore and Ohio Railroad for the year ending September 30, 1880, was 4,388,356 tons, an increase of 1,010,439 tons, over the previous year. The tonnage of the Main Stem was 2,255,146 tons, of which 1,641,559 tons were carried to Baltimore, 190,331 tons delivered at local points, and 423,256 tons were for company's use. The coal and coke tonnage of the Pittsburgh Division was 1,821,256 tons, and of the Trans-Ohio lines 312,454 tons.

## BOSTON, MASS.

The receipts are shown below:—

<i>From</i>	<i>Tons, 1877.</i>	<i>Tons, 1878.</i>	<i>Tons, 1879.</i>	<i>Tons, 1880.</i>
Alexandria, Virginia.....	77,956	36,408	19,457	27,149
Georgetown, District of Columbia.....	10,150	58,046	61,140	79,520
Philadelphia, Pennsylvania.....	696,837	732,449	805,679	767,940
Baltimore, Maryland.....	157,553	173,432	219,681	239,887
Other places (New York, etc).....	272,781	304,469	710,764	603,112
Great Britain.....	22,952	18,823	18,971	24,336
Nova Scotia.....	36,330	20,260	18,318	35,674
<b>Total.....</b>	<b>1,274,559</b>	<b>1,343,887</b>	<b>1,845,010</b>	<b>1,777,648</b>

The receipts of foreign and domestic coal at this port have been,—

<i>Years.</i>	<i>Foreign.</i>	<i>Domestic.</i>	<i>Years.</i>	<i>Foreign.</i>	<i>Domestic.</i>
1880.....	60,040	1,717,608	1872.....	90,739	1,068,791
1879.....	37,289	1,816,721	1871.....	109,013	822,808
1878.....	39,083	1,304,804	1870.....	115,022	819,890
1877.....	59,282	1,215,277	1869.....	110,466	764,017
1876.....	32,628	1,147,576	1868.....	103,901	742,481
1875.....	32,444	1,200,578	1867.....	117,440	680,221
1874.....	51,438	1,125,516	1866.....	159,330	676,376
1873.....	87,700	1,076,673	1865.....	209,225	538,917

These figures include all the coal arriving at this port; for the home trade, and for the points reached by railroads centering here.

The following are the highest and lowest prices for Anthracite coal, by the cargo, for the years named, as per statistics of the *Commercial List*:—

<i>Years.</i>	<i>Prices.</i>	<i>Years.</i>	<i>Prices.</i>
1880.....	\$5.50 @ \$6.50	1876.....	\$6.00 @ \$8.25
1879.....	4.00 @ 6.50	1875.....	7.00 @ 9 00
1878.....	5.00 @ 6.50	1874.....	7.00 @ 9.00
1877.....	4.50 @ 7.00	1873.....	8.00 @ 10.00

The imports of foreign coal; either for Gas or Steam, were larger during 1880, than for some years; the changes in the ports of shipment are indicated from the large tonnage credited to New York ports. The foreign coal was largely Nova Scotia, for the reason that there is a large increase in the use of steam power in New England, as against water power, and the Nova Scotia 'culm' mixed with Anthracite screenings forms a growing trade, as a steam raising fuel.



## NEW ORLEANS, LA.

As will be seen from the tabular statement given below, the receipts of coal at this city during the year, ending with November 1880, were larger than during any single year since 1870. The total arrivals numbered 356 boats, (9,000 bbls. each) and 40 barges (4,500 bbls. each,) while the consumption was the contents of 332 boats and 47 barges. Prices during 1880 ranged about 35 cents per bbl., of  $2\frac{1}{2}$  bushels throughout the year. 50,000 bbls. of St. Bernard coal from Kentucky, was also received and consumed at this port during the year. Eleven barrels make a ton of 2,000 lbs., nearly. But little Anthracite is used or consumed at this port. Since 1873, the Galveston steamers, using 300,000 bbls. coal per annum, have not taken their coal here, but direct from Pittsburgh at Morgan City. Were this quantity added to the business (as formerly) a large increase over any previous year would be recorded, showing that business is improving. The coal sent to planters below the city is included in the consumption, while that left on the coast above is not considered. Of the 47 pieces consumed, designated as barges, 11 were French Creeks or small boats. Average contents:—Boats about 9,000 bbls. Barges 4,500 bbls. French Creeks 3,400 bbls.

The coal brought to this market is almost exclusively Pittsburgh coal. The flats and barges are towed by powerful tow-boats built expressly for that purpose. The towing between Pittsburgh and Louisville depends on the state of the river. When the stage of water is too low for navigation, which it frequently is for weeks, and even months, the supplies at the lower points become deficient, and prices naturally advance, often reaching very high prices. The coal flats and barges sent to New Orleans are generally dropped at Willow Grove, near Greenville, just above the city, where they are superintended for the owners or agents. When a boat or barge is wanted, a small city tug-boat is sent to tow it to the city, or to its destination on the coast. Messrs. C. A. Miltenberger & Co., give the following as the consumption of Pittsburgh coal at this port:—

<i>Year.</i>	<i>Bbls.</i>	<i>Year.</i>	<i>Bbls.</i>
1869.....	3,317,000	1875.....	2,448,000
1870.....	3,203,500	1876.....	2,802,700
1871.....	3,112,000	1877.....	3,014,200
1872.....	2,991,500	1878.....	2,999,600
1873.....	2,821,500	1879.....	2,421,100
1874.....	2,749,500	1880.....	3,187,400

The distance from Pittsburgh to New Orleans is some 2,000 miles, and the rate of freight is about three and one-half cents per bushel.

## CHICAGO, ILL.

The total receipts of coal at Chicago have been:—

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1871.....	1,081,472	1876.....	1,619,033
1872.....	1,398,024	1877.....	1,749,091
1873.....	1,668,257	1878.....	1,832,033
1874.....	1,359,496	1879.....	2,410,770
1875.....	1,641,488	1880.....	2,686,748

The receipts by Lake have been:—

ANTHRACITE.		BITUMINOUS.	
1870.....	340,730 tons.	1870.....	181,850 tons.
1872.....	495,765 tons.	1872.....	90,820 tons.
1873.....	538,837 tons.	1873.....	199,107 tons.
1874.....	395,680 tons.	1874.....	261,790 tons.
1875.....	518,971 tons.	1875.....	272,831 tons.
1876.....	362,373 tons.	1876.....	334,055 tons.
1877.....	442,325 tons.	1877.....	360,158 tons.
1878.....	325,553 tons.	1878.....	404,447 tons.
1879.....	464,876 tons.	1879.....	300,324 tons.
1880.....	419,823 tons.	1880.....	266,544 tons.

The receipts by rail during the year 1879, consisted of 375,715 tons Anthracite, and 1,266,576 tons Bituminous. In 1880, 359,458 tons Anthracite, and 1,640,923 tons Bituminous.

The small receipts by Lake are due to the early closing of navigation; Anthracite alone would have been fully 100,000 tons more than recorded but for this fact. Dealers had delayed ordering, and the cold weather closing Navigation, left but a short supply to begin 1881, as against an unusual quantity in hand, at the opening of 1880. There was a scarcity of cars during the last three months of 1880, and this retarded the receipts of Anthracite in this way, so that Chicago experienced high prices for fuel during the past winter.

It will be noticed from the statistics above given that the receipts, were larger in the past year than ever before; this is due to the growth of the country, and the distribution of Anthracite at low rates during 1878-9. The trade in all varieties of coal is bound to be larger than heretofore in this part of the Union, and Anthracite will be in demand to an extent, that the prices at the eastward can easily be maintained. The shipments of coal to interior points last year, amounted to 618,027 tons, as against 498,324 tons during 1879. Coal is sent from this point to places in Michigan, Wisconsin, Nebraska, Minnesota, and even Dakota. Shipments of coal to a much greater extent than formerly are now made direct from the mines, much of it not touching Chicago, although sold by Chicago dealers. Were such sales included in the figures above given the aggregate would be immensely increased.

Prices of coal at this point were fairly steady all the year, until November, since then the retail prices have been advanced. Wholesale for Anthracite at the beginning of the year 1881 was \$6.75@ \$7.30. Brier Hill \$8.00 per ton.

## BUFFALO, N. Y.

The city of Buffalo is the most prominent of any of the Lake ports, as a coal shipping point, and the tonnage is growing yearly, into proportions that would amaze the dealer or statistician of only five years ago. The varieties received here number all the Anthracite qualities, and the Reynoldsville, Fairmount, Cameron, Blossburg, McKean county, and other Bituminous coal. Of the Anthracite received during 1880, there were 554,670 tons shipped by Lake; and by rail West and into Canada, 350,000 tons. The quantity of Bituminous consumed in the city, for various purposes was 350,000 tons; and of hard coal 50,000 tons for manufactures and 150,000 tons for domestic consumption.

Receipts have been as below:—

Year.	<i>Blossburg.</i>		<i>Bituminous.</i>		<i>Anthracite.</i>	
	<i>By Rail.</i>	<i>By Canal.</i>	<i>By Lake.</i>	<i>By Rail.</i>	<i>By Canal.</i>	<i>By Rail.</i>
1873.....	80,000	125,000	87,724	190,000	255,044	479,885
1874.....	50,000	70,000	67,467	140,000	252,262	320,000
1875.....	75,000	45,000	92,767	350,000	250,206	500,000
1876.....	25,000	30,000	21,418	297,842	151,175	350,000
1877.....	50,000	10,000	44,247	214,200	209,609	550,000
1878.....	45,000	13,353	50,001	425,973	115,162	660,000
1879.....	60,000	12,000	36,648	637,022	92,134	1,000,000
1880.....	65,000	11,777	13,073	800,000	83,240	850,000

## SHIPMENTS OF ANTHRACITE, west via the Lake:—

1873.....	510,443 tons.	1877.....	405,074 tons.
1874.....	344,500 tons.	1878.....	306,172 tons.
1875.....	339,722 tons.	1879.....	550,646 tons.
1876.....	321,455 tons.	1880.....	554,670 tons.

## SHIPMENTS OF BITUMINOUS, east via the Erie Canal.

1873.....	68,210 tons.	1877.....	29,250 tons.
1874.....	46,995 tons.	1878.....	39,820 tons.
1875.....	23,100 tons.	1879.....	28,290 tons.
1876.....	19,153 tons.	1880.....	25,361 tons.

Vessel freights from this port to Chicago ranged from 75 cents per ton free on March 27th, to \$1.00 at the close, on November 15th. From April 8th, to October 18th, the ruling rate varied but little, from fifty cents per ton. Rail freight from Buffalo to Chicago, was \$1.75 per ton throughout the season.

Distances from Bituminous coal mines to this city, by rail:—Bell, Lewis and Yates, 186 miles; Hamilton Coal Company, 194 miles; F. Williams & Co., (Du Bois,) 185 miles; (Reynolds,) 193 miles; Powers, Brown & Co., 194½ miles; Sandy Lick Coal Company, 185 miles; Fairmount Coal Company, 234 miles; Cattish mines, 198 miles; Stoneboro, 204 miles; St. Mary's Coal Company, 143 miles; Cameron, 125 miles; Buffalo Coal Company, 131 miles.

On January 1, 1881, the rate of transportation from Penn Haven (a focal point for Lehigh coal) to Buffalo was \$3.26 per ton in box cars. From Coxton (a focal point for Wyoming coal,) in coal cars \$3.11, and in box cars \$2.81 per ton. Wholesale price of Anthracite same date:—Grate and Egg \$5.25, Stove \$5.55, Chestnut \$5.80.

Anthracite carried and sold on basis of 2,240 lbs. to the ton, and Bituminous on basis of 2,000 lbs.

## PITTSBURGH, PA.

We think it is safe to estimate the consumption of coal and coke for all purposes, in this city, during the year 1880, at two millions of tons. The year was one of great industrial activity, and this city is a perfect hive of such industries as are peculiarly large users of fuel. Prices ruled low, and as will be seen on the succeeding page, averaged but slightly over six cents per bushel, or say \$1.75 per ton of 2,000 lbs., for the entire year. The Pittsburgh coal is the principal coal bed of Southwestern Pennsylvania, and most of the mineral fuel which is mined along the Youghiogheny and Monongahela rivers, to be used in the coke ovens of the Connellsville region, and in the blast furnaces and mills and factories of Pittsburgh and its vicinity, and to be shipped to western and southern markets, comes from this bed. It is the great bed of the Cumberland coal basin in Maryland, and a small fragment of the bed remains in the highest summit of Broad Top, in Blair county. From all the rest of the State, the bed has been removed by erosion. So much by way of introduction; the total business done by the wholesale dealers in coal and coke, having headquarters in this city, is above eleven millions of tons, and employing in the manipulation thereof, over twenty thousand persons. We may say that nearly all the coal produced in the first and second Bituminous coal districts, elsewhere more minutely referred to, is under the influence of the capital, brains and labor of at least a portion of the citizens of Pittsburgh. The business of the Monongahela slack-water navigation company last year, was 3,361,934 tons of coal, and 200,000 tons of coke; the majority of this goes to points below, and the portion that enters into local consumption at Pittsburgh, Allegheny City, etc., is not more than half a million tons. Coal by rail from the mines within fifty miles radius, fills up the other proportion of the fuel requirements of this city. We have given a special chapter to Connellsville coke, of which this city is headquarters; within five years the production of this commodity has quadrupled, and it is now used East of the Hudson river, and as far West as Salt Lake City; and whenever and wherever coal is found that will coke at all, the endeavor is made to have it somewhat approach "Connellsville," in its elements. In the coke-making business there are firms owning thousands of ovens, who make it for sale, and there are also mines and ovens producing this coke for use at furnaces. We give an enumeration of the coking ovens, and the owners thereof, on another page. The tonnage reported as being done by the 'railroad' mines last year, was largely in excess of any preceding one, and there is an improved outlook for trade during this year, as many large operations have been opened up. It is stated that the capacity of the mines shipping by water is a million bushels of coal daily, and if they had full work for ninety days they would supply the entire trade dependent upon the Ohio river. Nearly all the mines located in this vicinity are what are turned drifts, and the mining and shipping entails but little expense to the proprietors, and hence this coal finds a market in such distant points at remarkably low rates. A division of the trade seldom noticed, is the special collieries for mills whose mines are contiguous; the coal being run into the yards of the mills from the mines. In short the prominent points of this seam are: its great regularity and uniformity over an extensive district, the excellent quality of its coal, its cheapness of production, and its unparalleled advantages for long transportation.



## PRICE OF COAL AT PITTSBURGH, PA.

PRICE OF COAL RUN OVER  $1\frac{1}{2}$  INCH SCREEN, F. O. B. CARS UNION YARD, PITTSBURGH, PA.—THESE  
PRICES ARE FOR ONE HUNDRED BUSHELS, 76 LBS. PER BUSHEL.

Months.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.
January.....	\$7 50	\$7 50	\$9 50	\$8 00	\$5 50	\$5 50	\$6 00	\$5 75	\$5 00	\$6 75
February.....	7 50	7 50	9 50	7 50	5 50	5 50	5 75	4 75	5 25	7 00
March.....	7 50	7 50	9 50	8 00	6 50	5 25	5 75	4 75	5 00	6 75
April.....	7 50	7 50	9 50	8 00	6 50	5 25	5 75	4 75	4 75	6 75
May.....	7 50	7 50	9 50	8 00	6 25	5 25	5 75	4 75	4 75	6 00
June.....	7 50	7 50	9 50	7 50	6 25	5 25	5 25	4 75	4 75	5 75
July.....	7 50	7 50	9 50	7 50	6 00	5 25	5 25	4 00	4 75	5 75
August.....	7 50	7 50	9 50	7 50	6 00	5 25	5 75	4 00	4 75	5 75
September.....	7 50	8 00	9 50	7 00	5 50	5 25	5 75	4 00	4 75	5 75
October.....	7 50	8 75	9 50	7 00	5 50	5 25	5 75	4 25	5 50	6 25
November.....	7 50	A9 50	8 50	7 00	5 50	5 25	5 75	4 25	B6 60	6 50
December.....	7 50	9 50	8 50	6 50	5 50	4 75	5 75	4 25	6 00	6 50
Average.....	7 50	7 98	9 33	7 46	5 87	5 25	5 60	4 62	5 15	6 29

General average for ten years is \$6.50.—Average for last five years is \$5.38.

A.—Price made by R. R. Coal Exchange from November, 1872 until November, 1873.

B.—Price advanced on account of decision of Arbitrators.

C.—Price until April 26th; then reduced to \$6.00.

Above prices are for coal delivered in Individual cars only.

## PRICES PAID FOR MINING PITTSBURGH COAL.

PRICE OF COAL MINING ON RAILROADS ENTERING CITY OF PITTSBURGH FOR COAL RUN OVER A  $1\frac{1}{2}$   
INCH SCREEN—PER ONE HUNDRED BUSHELS, 76 LBS. PER BUSHEL.

Months.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.
January.....	\$4 00	\$4 00	\$5 00	\$4 00	\$2 75	\$2 50	\$3 00	\$2 66	\$2 66	\$3 50
February.....	4 00	4 00	5 00	4 00	2 50	2 50	3 00	2 66	2 66	3 50
March.....	4 00	4 00	5 00	4 00	3 00	2 50	2 50	2 66	2 50	3 50
April.....	4 00	4 00	5 00	4 00	3 00	2 50	2 50	2 50	2 28	C3 50
May.....	4 00	4 00	5 00	3 75	3 00	2 50	2 50	2 50	2 28	3 00
June.....	4 00	4 00	5 00	3 50	3 00	2 50	2 50	2 50	2 28	3 00
July.....	4 00	4 00	5 00	3 50	3 00	2 50	2 50	1 90	2 28	3 00
August.....	4 00	4 00	4 00	3 50	3 00	2 50	3 00	1 90	2 28	3 00
September.....	4 00	4 00	4 00	3 25	2 50	2 50	3 00	2 28	2 40	3 00
October.....	4 00	4 50	4 00	3 00	2 50	2 50	3 00	2 28	2 75	3 50
November.....	4 00	5 00	4 00	3 00	2 50	2 37	3 00	2 28	B3 50	3 50
December.....	4 00	5 00	3 20	3 00	2 50	A2 00	3 00	2 28	3 00	3 50
Average.....	4 00	4 20	4 51	3 55	2 77	2 45	2 79	2 36	2 57	3 29

Ranged from \$1.75 (in December 1876) to \$5.00 (1872 and 1873.)

A.—Three prices this month viz \$1.75—\$2.00 and \$2.25—average \$2.00.

B.—Paid according to decision of Board of Arbitrators.

C.—\$3.50 until April 26th; then reduced to \$3.00.

General average.—for ten years \$3.25—for last five years \$2.69.

At mines that pay for the unscreened coal, the price is adjusted as follows—8 cents per ton of 2,000 lbs. for each 50 cents per 100 bushels, of  $1\frac{1}{2}$  inch, screen coal.

## SAN FRANCISCO, CAL.

The statements given below will serve to indicate the consumption of the several varieties of coal at San Francisco. The principal sources of supply are from Mt. Diablo, in the immediate vicinity; from Coos Bay in Oregon; and Seattle in Washington Territory; from Vancouver Island: from Australia and Great Britain; as also Cumberland and Anthracite, from the Atlantic coast; coal has also been received in small quantities from Chili, Sitka, Alaska and Japan, while the domestic sources of supply are constantly on the increase as the schedules show:—

<i>Year.</i>	<i>Total Receipts.</i>	<i>Year.</i>	<i>Total Receipts.</i>
1860.....	77,635	1871.....	315,194
1861.....	116,245	1872.....	434,467
1862.....	120,545	1873.....	454,582
1863.....	135,550	1874.....	531,947
1864.....	167,298	1875.....	538,209
1865.....	150,147	1876.....	648,388
1866.....	192,601	1877.....	576,760
1867.....	248,925	1878.....	626,834
1868.....	282,025	1879.....	618,519
1869.....	328,973	1880.....	654,118
1870.....	320,493		

<i>Qualities.</i>	<i>Tons, 1879.</i>	<i>Tons, 1880.</i>
<b>FOREIGN.</b> Australian.....	80,175	59,873
English.....	36,588	66,660
Vancouver.....	160,142	169,162
<b>EASTERN.</b> Anthracite.....	21,982	19,629
Cumberland.....	1,777	20,916
<b>DOMESTIC.</b> Mount Diablo.....	134,435	158,723
Coos Bay.....	45,909	35,415
Seattle.....	135,012	123,741

The Vancouver coals furnish the larger portion of the foreign coal, there being better facilities for getting it to this market. The Seattle is in favor, and it is difficult to get it to market as fast as wanted. As will be noticed the trade is growing at this point and will be over 700,000 tons annually before long. The Cumberland coal is sold exclusively for Blacksmithing purposes. Freights were high, and the weather cold, so that San Francisco had a coal famine, with prices at \$20 per ton, for the month of November, 1880. A coal said to be equal to that of Maryland, is reported as having been found near Puget Sound (30 miles from Tacoma) and one of the veins has been named the Pacific Cumberland. Another vein is a good gas coal; this is expected to develop into a considerable source of supply for the Pacific coast ports. The railroads leading North and South from San Francisco, must have coal from this port, and as they are advancing into the interior, they will yearly require more and more coal. The Rocky Mountain coal fields are being developed, and this will give coal for all the industries of the coast.

## CINCINNATI, OHIO.

The coal received at this city includes Youghiogheny; Ashland, Ky., the Pomeroy from the vicinity of Pomeroy, Ohio; Hocking Valley, Ohio; Muskingum Valley, Ohio; Ohio river; the Kanawha from West Virginia, including the Splint, Bituminous and Channel, and the Anthracite from Pennsylvania. The years given end with August 31st, and the tons are of 2,000 lbs.

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1853-54.....	302,148	1867-68.....	648,148
1854-55.....	383,555	1868-69.....	944,444
1855-56.....	277,777	1869-70.....	1,122,222
1856-57.....	537,037	1870-71.....	850,814
1857-58.....	555,555	1871-72.....	1,140,399
1858-59.....	458,988	1872-73.....	1,010,018
1859-60.....	540,740	1873-74.....	1,305,285
1860-61.....	462,962	1874-75.....	1,311,488
1861-62.....	314,814	1875-76.....	1,489,108
1862-63.....	296,296	1876-77.....	1,468,619
1863-64.....	591,680	1877-78.....	1,441,754
1864-65.....	609,889	1878-79.....	1,269,339
1865-66.....	667,514	1879-80.....	1,787,230
1866-67.....	683,195		

The receipts for last year, as will be noticed, were the largest of any year; being nearly fifty per cent. above the receipts of the preceding year. There was also an increased price for the commodity. Pittsburgh coal, afloat, averaged \$2.50 per ton for last year, and Anthracite was sold, *delivered*, at an average of \$6.68 per ton.

The shipments of coal from the city to interior points footed up some 371,774 tons, so that the coal retained for consumption was 1,415,483 tons. The relative proportions of the several varieties continues: Pittsburgh furnishing 65.8 per cent; Kanawha river 18.9 per cent; Ohio river 8.9 per cent. Anthracite footed up 28,483 tons, as against 30,750 tons in 1879. Coke sells largely, and the receipts were 3,251,208 bushels, not including 1,900,500 bushels made at the Cincinnati and Covington gas works.

## ERIE, PENNA.

There is a business done in coal at this city, of 650,000 tons annually. The local consumption amounts to 200,000 tons, and the remainder is forwarded West, by rail and vessel, from this city. We have no details for 1880, but the following for 1879, will serve to show the course of the trade.

*Receipts of coal at Erie, Pa., for 1879.*

<i>Carried by.</i>	<i>Anthracite.</i>	<i>Bituminous.</i>
Philadelphia & Erie R. R.....	193,000 tons.	52,400 tons.
Erie & Pittsburgh R. R.....	—	214,767 tons.
L. S. & M. S. R. R.....	—	176,724 tons.

## SHIPMENTS.

By Lake.....	78,483 tons.	193,052 tons.
By Rail.....	81,269 tons.	84,064 tons.
Erie local use.....	33,248 tons.	166,775 tons.

The shipments by Lake have been as below:—

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1870.....	312,081	1876.....	233,012
1871.....	377,457	1877.....	232,326
1872.....	350,159	1878.....	224,553
1873.....	325,711	1879.....	271,535
1874.....	217,500		
1875.....	174,672		

## CLEVELAND, OHIO.

This city receives a fine and varied assortment of Bituminous coal. A great many coal basins—in fact, nearly all the Ohio formation, as well as most of the coals lying west of the Allegheny Mountains, in Pennsylvania—here find a market and a distributing point from the West, Northwest, Eastern and Canada trade. The great number of vessels employed in the iron ore and lumber trade naturally seek coal as a back freight or for ballast, which enables Cleveland to place coal in distant ports, like Chicago, Milwaukee and on Lake Superior, at merely nominal rates.

The total receipts of coal at Cleveland, from 1828 to 1852, amounted to 662,862 tons; having increased from thirty tons in 1828, to 137,926 tons in 1852; we have no details from that date until 1865, but the following will serve to show the growth of the trade:

Year.	Tons.	Year.	Tons.
1865.....	465,550	1873.....	1,599,212
1866.....	583,407	1874.....	1,215,353
1867.....	668,026	1875.....	1,414,124
1868.....	759,104	1876.....	1,250,531
1869.....	922,757	1877.....	1,363,345
1870.....	904,600	1878.....	1,310,838
1871.....	1,165,940	1879.....	1,576,807
1872.....	1,348,160	1880.....	1,750,000

The receipts for 1880, are divided as below:—

Bituminous coal by rail.....	1,250,000 tons.
Bituminous coal by canal.....	220,000 tons.
Bituminous coal at Newburgh (18th ward).....	275,000 tons.
	<hr/> 1,750,000 tons.
Anthracite coal by rail.....	52,632 tons.
Anthracite coal by lake.....	7,859 tons.
	<hr/> 60,491 tons.

Lake shipments of Bituminous coal.

	1876.	1877.	1878.	1879.	1880.
To ports in British Provinces.....	156,857	80,243	61,869	46,174	60,527
To domestic ports.....	372,834	549,920	597,412	580,610	654,953

This city more than maintains its position as a distributing centre of coal, to the West and Northwest; and so long as the yearly output of coal in Ohio continues to grow at its present pace, there must be a still further increase in the tonnage from this city. Ashtabula and Black River cease to be rival candidates for the coal shipping business, with Cleveland. All the railway lines of importance that are located or about to be located in the State of Ohio, make for Lake Erie as a point of vantage for the transaction of business, and there is no city that compares with the Forest City. The coal seams of the State of Ohio, are numerous, of good size and near the surface. The mines can be opened with little expense, and inasmuch as the output has more than trebled during the last decade, what an immense tonnage there will be done ten years hence at the same ratio, and, as we have said, Cleveland is the shipping port.



## RICHMOND, VA.

This city is assuming considerable importance in the coal trade, through the efforts of the Chesapeake and Ohio Railroad. We append statistics of the total coal business of the railroad company.

Quality.	Tons, 1877.	Tons, 1878.	Tons, 1879.	Tons, 1880.
Cannel.....	42,000	47,899	33,261	43,080
Splint and Bituminous.....	245,995	277,041	395,609	526,990
Coke.....	36,070	17,700	23,063	36,374
Total.....	324,065	342,480	451,833	606,444
Shipments of coal to Eastern cities were.....	124,980	140,921	174,526	216,809

The following statement of coal receipts at the Richmond market, for the city consumption, taken from official returns, will not be without interest:—

Character of coal.	Tons, 1877.	Tons, 1878.	Tons, 1879.	Tons, 1880.
Chesapeake and Ohio.....	50,656	54,552	64,117	47,043
Anthracite and Cumberland.....	46,875	39,709	60,120	70,000
Chesterfield, etc., etc.....	36,010	34,621	40,377	50,000
Totals.....	133,541	128,882	164,614	167,043

In 1879; of the miscellaneous coal, 23,715 tons were Midlothian, via R. & D. R. R., 9,776 tons, via R. & P. R. R., 3,065 tons Brighthope by water, and 3,821 tons by James River and Kanawha Canal. We have not received details for 1880. For coal trade of Kanawha region, see chapter under that head.

## MOBILE, ALABAMA.

The coal used at this point is mainly from Alabama, and although not large as yet, the quantity is said to be increasing. The coal is received by rail, and is sold at \$3.75 per ton in car load lots. The Pennsylvania coal received is for the gas works. Foreign coal came in as ballast last year, and was sold cheap. Years end with the 31st of August.

	1880.	1879.	1878.	1877.	1876.
Tons, Alabama coal.....	5,396	3,015	1,349	1,466	2,141
Tons, Penna. and English coal.....	1,033	3,352	2,689	8,069	2,851

During the winter months, coal sold as high as \$10 per ton for Anthracite and Pittsburgh, and \$8@ \$9 for Alabama. Receipts for the calendar year 1880, were 5,096 tons of Alabama coal, and 1,318 tons of Pennsylvania and foreign coal. It will be noticed that the Alabama coal receipts are constantly increasing in volume. Captains of steamers report the Alabama coal equal to the Pittsburgh or English coals to be had at Gulf ports. We are indebted to Mr. W. H. Leslie, for these details.

## NEW HAVEN, CONN.

The receipts of coal of all kinds, at this point, during 1880, figure up about ten per cent. less than in 1879. We put tonnage at 600,000 tons, as against 650,000 tons in 1879, and against 458,700 tons in 1878.

## BRIDGEPORT, CONN.

Receipts during 1880, say 180,000 tons, as against 200,250 tons in 1879, and 144,580 tons in 1878.

## NEW YORK CITY.

It is safe to say that the consumption of coal in, and received at New York City, is annually something over five and a quarter million tons. We find by experience that the consumption of domestic fuel will average in cities, two tons per inhabitant per year; this gives 2,500,000 tons of Anthracite for this purpose. To be added to this say 1,000,000 tons of Anthracite for steam purposes generally: factories, ferry-boats, river and coasting steamers. Of gas coal there is 300,000 tons annually consumed for the purpose of affording light to the inhabitants. Of Bituminous and Semi-Bituminous for steam uses, to the railways, steamers and factories generally, say 1,250,000 tons. We may add at least 100,000 tons of Bituminous for household uses. The smaller sizes of Anthracite are largely used for steam raising, both under stationary and marine boilers. Our imports of foreign coal last year were not over 100,000 tons, apart from the coal brought over by ocean steamers for their return voyage, either in whole or in part. Every building in which there are elevators constantly adds to the consumption of coal in this city; the elevated railroad systems are said to use upwards of 100,000 tons annually. Bituminous coals from Maryland, Virginia, Pennsylvania, Ohio and Great Britain and Nova Scotia are received here, and of the Pennsylvania coals there are all grades and qualities.

## MILWAUKEE, WIS.

The coal is received by Lake, and is about evenly divided between Anthracite and Bituminous. One-fourth of the receipts are afterward sent to the interior by rail. We have the following details of the Lake receipts.

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1870.....	122,865	1876.....	188,444
1871.....	175,526	1877.....	264,784
1872.....	210,194	1878.....	239,667
1873.....	229,784	1879.....	265,000
1874.....	177,655	1880.....	270,000
1875.....	228,674		

## MONTREAL, P. Q.

There is an increasing business done in coal at this city. There was more Anthracite sent in last year than in preceding years, notwithstanding the duty of fifty cents per ton, levied by the Dominion, upon American and British coal. The American duty of seventy-five cents has been imposed on Provincial coal, since August, 1872, and this action of the Dominion Government is intended as retaliatory, and to foster the consumption of the Provincial coal in the Canadas. There was more coal sent from the Provincial mines last year to the upper Provincial ports, but the trade in American coal is still growing; this increased coal consumption is due to the improvement in business generally.

Receipts aggregate some 350,000 tons annually; 135,549 tons Anthracite from the States, 58,468 tons Bituminous from Great Britain, and 150,000 tons from the lower provinces, being the figures for last season. Seven thousand tons of Welsh Anthracite coal was received last year, and it is said to render as good service as American.

## COAL TRADE OF OHIO.

The coals of Ohio are all of the Bituminous variety, and are known by various and general names, as block coal, gas coal, cannel coal, etc., and by many special names, as Mahoning Valley coal, Hocking Valley coal, Salinesville coal, etc., according to the localities from which they are drawn. The best furnace coal is the block coal of the Mahoning Valley; the best coke is made from the coals at Leetonia and Washingtonville, in Columbia county; the best house coal is found in Jackson county; the best gas coal, so far as recent tests would seem to indicate, is the Barnesville coal, of Belmont county.

In the Mahoning Valley, raw coal is used in the blast furnaces in the region, with a little Connellsville coke. In the Hocking Valley, raw coal is also used. In Jackson county, raw coal from two seams—the Jackson shaft coal, and the Wellston coal is used. At Leetonia, coke is used, partly native, and partly Connellsville. At Steubenville, a mixture of coke and coal is used from the same seam—the shaft coal of the county. The Jefferson county coal is one of the most valuable in the State. Gas is made from the coals of the Mahoning Valley, the Hocking Valley, the Steubenville coal the Ohio river coal at Bellaire and Pomeroy, and the Hanging Rock coal of Ironton.

The Mine Inspector reports that the output of coal in Ohio for 1880 was 7,000,000 tons, employing 16,743 persons. The coal from the Mahoning Valley is most favorably known, as the Brier Hill coal is there produced to the extent of 1,250,000 tons annually. This district is only 65 miles from Lake Erie, with which there are abundant means of communication by the several railroads leading from Youngstown to the lake ports. Much of this coal arrives thereat; viz., Cleveland, Ashtabula, Painesville, and is thence distributed to the West and Canada by lake and rail connections.

The coal tonnage of the Hocking Valley for 1880, was as follows: Furnace consumption estimated at 350,000 tons, and other local consumption, 150,000 tons. The official statement is as below:

<i>Year.</i>	<i>Hocking Valley R. R.</i>	<i>N. S. &amp; S. R. R.</i>	<i>Hocking Canal.</i>	<i>Total.</i>
1874.....	549,052	200,417	41,101	790,570
1875.....	681,888	199,118	32,815	913,821
1876.....	762,049	223,476	39,172	1,024,697
1877.....	773,368	249,461	42,165	1,064,984
1878.....	860,293	200,194	47,352	1,107,839
1879.....	1,013,629	101,442	50,043	1,165,114
1880.....	1,174,496	216,063	40,849	1,431,408

Coal mining in Ohio is yearly growing in magnitude, and the future of this State as a coal producer is bright beyond calculation. During the past year four new coal fields have been opened, to wit: Coalton coal field of Jackson county, the Corning coal field of the Sunday Creek Valley, the Del Roy mines of Carroll county, and the Wheeling creek coal field along the extension of the Cleveland, Tuscarawas Valley and Wheeling railroad. Mr. A. Roy, the State Inspector of Mines, asserts that should the times continue prosperous for some years to come, the increase in the coal production of Ohio will be simply marvelous, and he declares that the mining facilities are such that next year 8,500,000 tons of coal will doubtless be produced, and that if necessary the output could be increased to 12,000,000 tons.

## PACIFIC COAST COALS.

The coal fields of the western coast of North America are limited in extent. Mr. W. A. Goodyear, formerly of the State Geological Survey, tells us that they are of comparatively recent geological origin. They are none of them of the carboniferous age, and, indeed, so far as yet known, none of them date back of the cretaceous period. The beds mostly furnish a non-caking bituminous coal, which belongs to the class of lignites, or brown coal. Vancouver's Island, however, produces caking coal; and some caking coal of good quality has also been found in Washington Territory; but no workable mine of Anthracite has ever been discovered on this coast, and the little that has been found, has proved on investigation to have been the result of local and special metamorphism.

Of the two States and one Territory which border on the Pacific Ocean, between Mexico and British Columbia, Washington Territory is by far the most liberally supplied with coal. Oregon comes next, and California last. In fact, California is decidedly unfortunate in the extent and character of her coal fields. For, although it is easy to find coal at many localities in the Coast range from one end to the other, as well as at certain points in the western foothills of the Sierra, yet it generally happens either that its quality is poor, or the quantity is small, or else that it is situated in the heart of the mountains, so far from market that the cost of transportation alone would far exceed the value of the coal.

The Mt. Diablo coal, which is mainly used for steam coal in San Francisco, and on the steamers of the bay, is of poor quality, and, owing to its sulphur, is disliked for domestic purposes.

The Coos Bay coal-field covers several hundred miles of territory in Oregon, stretching from the Umpqua River, on the north, to points beyond the Coquille River, on the south, and extending back from the coast to from 15 to 20 miles interior. The country is covered with a heavy growth of timber. The coal to be mined at a profit must be of good quality, favorably situated for cheap mining, and very close to navigable waters.

The coal mines of Washington Territory are situated at Bellingham Bay, close to the British Columbia line, and in the vicinity of Seattle, on the eastern shore of Puget Sound. The Seattle coal-field is one of the most important on the coast, and covers a large area. Some of the best coal on this coast comes from Vancouver's Island. The Wellington coal comes from there, and is considered a first-class coal.

We give below the shipments of Vancouver Island coal. This island is located within the limits of the dominion of Canada. The coal area is estimated at 390 square miles. San Francisco receives a large percentage of the output.

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1870.....	29,863	1876.....	140,087
1871.....	45,000	1877.....	154,052
1872.....	46,148	1878.....	190,640
1873.....	45,723	1879.....	228,974
1874.....	81,397	1880.....	250,000
1875.....	110,145		

Tons are stated at 2,240 lbs.



In our summary of the output of coal in the Union, we credit Washington Territory with 175,000 tons; of this, something like 130,000 tons are shipped from Seattle to San Francisco. We append details of the shipments.

1871.....	4,918 tons.	1876.....	112,734 tons.
1872.....	14,830 tons.	1877.....	104,556 tons.
1873.....	13,572 tons.	1878.....	123,582 tons.
1874.....	9,027 tons.	1879.....	132,264 tons.
1875.....	70,157 tons.	1880.....	123,741 tons.

From Coos Bay, in Oregon, there is a business of 50,000 tons annually to San Francisco, but of late nothing from Bellingham Bay. We find the following analysis of Coos Bay and Astoria coals compared with the Nanaimo and Bellingham Bay.

	Astoria coals.	Coos Bay.	Nana- imo.	Belling- ham Bay
Water.....	2.56	20.00	2.98	8.39
Volatile matter.....	46.29	32.59	32.16	33.26
Fixed carbon.....	48.49	41.98	46.31	45.69
Ash.....	2.74	5.34	18.55	12.66

The output of coal in California is set down at 600,000 tons a year being for steam, manufacturing and domestic purposes. The Mt. Diablo coal is sold to the extent of 150,000 tons annually, in San Francisco. We append details:—

1871.....	133,485 tons.	1876.....	108,078 tons.
1872.....	177,232 tons.	1877.....	96,172 tons.
1873.....	171,741 tons.	1878.....	122,034 tons.
1874.....	206,255 tons.	1879.....	134,435 tons.
1875.....	142,808 tons.	1880.....	158,723 tons.

## COAL TRADE OF COLORADO.

This is the youngest of the States, but like everything else within her borders, there is an activity in coal and coke that would do justice to older commonwealths. One seldom thinks of this State other than as containing marvelous stores of silver, but she has the more useful commodities of coal and iron, in quantity and quality, that are all that could be desired. The increasing demand for railroad, manufacturing and domestic purposes puts this State on record as producing over half a million tons last year, while we may expect a still greater quantity for the current year. The Colorado Coal and Iron Co. (Denver and Rio Grande R. R. Co.), are working coal at Canyon, Walsenburgh, and El Moro. It is reported that their production is now one thousand tons per day. At El Moro, there are two hundred coke ovens. There has always been a demand for coke from the smelting furnaces at Leadville, etc., and Connellsville coke has been sent there; now the home product is taking the place of this, at much less price. We understand the price is \$5 per ton at the ovens, so that it is profitable as a business venture. At Denver, there is a rolling-mill and puddling furnaces, and at Pueblo, an extensive Bessemer steel plant is to be erected. With these industries well under way, the railroad lines extended, and population increasing, there is a

great future before the coal and iron mines of the State, for they will not only supply Colorado, but many of the adjoining States, with coal and iron. The coal output was as below, in 1879 and 1880.

	<i>Tons, 1879.</i>	<i>Tons, 1880.</i>
<b>SOUTHERN MINES</b> —Canyon,	78,000	107,574
El Moro,	21,000	81,697
Walsenburgh,	10,000	32,106
Trinidad,	10,000	25,000
<b>NORTHERN MINES</b> produced	275,000	325,000
El Moro Coke	13,000	26,868

There were 50,000 tons of the coal mined at El Moro made into coke, and the company sold, as above noted, 26,868 tons of coke. The Trinidad coal was for the use of A. T. & S. Fe R. R. Company.

### TENNESSEE COAL OUTPUT.

The production of coal is growing, and we have the official statement that the output for the year 1880, was 641,042 tons. This was nearly two hundred thousand tons in excess of the preceding year. It is divided between the Southern States Coal and Iron Company, at Victoria, 38,726 tons; the Tennessee Coal and Railroad Company, at Tracy City, 260,801 tons; the Coal Creek, 140,000 tons; the Soddy mines, 75,000 tons; the Rockwood Furnace mines, 51,515 tons, other small mines, carefully estimated, 75,000 tons. Inasmuch as the iron business is growing in the South, at a greatly increased ratio, there is bound to be an enlarged business in coal and coke. Seven-tenths of the iron manufacturing business of the South has been developed since 1875. The blast furnaces of Tennessee using coke as fuel, number eight complete and incomplete stacks. Six of these are in blast, and producing at the rate of 72,000 net tons annually. Two more stacks will be blown in before the 1st of May, adding to the product about 37,000 tons, and bringing it up to 109,000 tons of pig metal per annum. There are four stacks in Alabama using coke, which will produce about 60,000 net tons in 1881. They were all built since 1873. The product of the two coke furnaces of Georgia will this year be about 22,000 tons of pig metal. From all this it will readily be gathered that there is a very fair outlook for an increased coal production.

### ALABAMA COAL OUTPUT.

The production of coal is increasing; the mines are on the line of the Selma and Dalton; South and North; and Alabama Great Southern Railroads, and there is also a small tonnage by wagon delivery. We have the output for 1880, reported by the best authority in the State, as being 340,000 tons. The comparative figures are as below:

1874.....	49,889 tons.	1878.....	194,268 tons.
1875.....	75,806 tons.	1879.....	290,000 tons.
1876.....	102,640 tons.	1880.....	340,000 tons.
1877.....	172,182 tons.		

## COAL IN ILLINOIS.

The valuable features of the coal found in this State are :—that there is plenty of it, that it is widely distributed over the State, and readily accessible. Although it is generally necessary to mine it by means of shafts, the coal is reached at so reasonable a depth from the surface that its mining is done without unusual expense ; the railroads traversing the State furnish cheap transportation, and there is a ready market for all the coal that is produced. As compared with the coal produced in the Allegheny coal field of Pennsylvania, the quality of the Illinois coal is reported as inferior. The coal received from neighboring States is fully equal in quantity to the home production. Chicago receives a large proportion of its Bituminous coal from the Wilmington district, and it is of good quality, as will be seen from the analyses appended. The output of the district is nearly three-quarters of a million tons. The analyses are :—

Fixed carbon.....	47.405	47.939
Volatile matter.....	39.642	39.761
Water.....	6.981	7.013
Ash.....	5.972	5.287

We have the following statistics of the output in this district :

	<i>Tons, 1879.</i>	<i>Tons, 1880.</i>
Chicago, Wilmington and Vermillion Coal Co.....	294,217	331,984
Eureka Coal Co.....	158,235	155,317
Wilmington Star Mining Co. of Coal City.....	80,463	83,336
Wilmington Coal Mining and Manufacturing Co.....	85,559	92,165
Baird, Hixcox & Co.....	44,963	40,000
Bruce Coal Co.....	20,000	30,000

St. Louis, Mo., obtains a large supply of Bituminous coal from the Belleville district, in St. Clair county, Illinois. This county shows a very large coal area, and the output is perhaps a million and a quarter tons annually. The coal seam is seven feet in thickness and analyses 55.2 fixed carbon, and 33.8 volatile matter. There are some very large mining concerns in this district, and the coal has been coked with good results. The coal known as Big Muddy coal is of good quality and is a valuable iron-smelting fuel. As the business enterprises in the vicinity of St. Louis grow, there must be an increase in the coal production; the fact that the receipts there last year, were two and a half million tons, and mainly from Illinois, leaves no doubt but that we may hear of an extended tonnage from this State, that will more nearly approximate the figures of the coal output in Ohio. The coal trade of the West is in its infancy; there are facilities for distribution over a wide area of country, and the companies engaged in mining should do a profitable business.

We find it reported, apparently on good authority, that there are 177 coal mines in Indiana, giving employment to 3,459 men, with a production for last year, estimated at 1,196,490 tons.

The Ashland Coal and Iron Co., at their Coalton mines, located near Ashland, —y., sent to market during 1880, some 3,223,937 bushels of lump coal ; 949,625 bushels of nut coal ; 913,712 bushels of slack—total, 5,087,274 bushels.

Louisville coal consumption was very considerably increased during 1880, as compared with the preceding year, and we put it at 750,000 tons of all kinds ; say 500,000 Pittsburgh, 100,000 tons Kentucky, and the remainder Ohio river coal and coke. Anthracite was not over 10,000 tons.

## WYOMING AND UTAH.

The Union Pacific Railroad controls about all the coal mines and lines of transportation within the territories of Wyoming, Utah, Idaho and Montana, while Nevada, and even California, have to depend largely upon that corporation for much of their coal. The company have extensive mines at Carbon, Rock Springs, and Almy, in Wyoming, and also at Coalville and other places, in Utah, which are reached by branch lines.

There is a marked increase in the consumption or demand for coal. A new demand has sprung up by the opening and extension of the Utah and Northern road through Idaho, and into Montana. The only coal vein as yet opened north of the U. P. main line, is that of some croppings near Shineberger's, forty miles south of Dillon; and it has not yet come into market.

The Central Pacific Company's mines at Almy, Wyoming, put out about 600 tons per day, which goes to supply the road, west of Ogden. The extent of the coal deposits seems to be unlimited, and some of the mines already have chambers in over one mile from the head of their drift, or incline. During the cry of more coal, and dangers of a coal famine that prevailed in November and December last, the company did all they could to supply the demand, and kept the price at old quotations; inasmuch as the sales are not more than one-fourth of the production (the balance going for railroad use), and the amount received per ton is about six dollars, and the cost not more than one-fourth thereof, no great credit is due the company, for this consideration. We append a few details of the U. P. R. R. Company's business.

	Production.	Cost of coal.	Coal sold.	Price realized.
1878.....	275,795 tons.	\$1.04	102,240 tons.	\$6.13
1879.....	340,152 tons.	1.07	125,662 tons.	5.65

## MISSOURI.

We put the output of this State during 1880, at one and a half million tons. There are workable beds of coal within the north and northwestern portions of the State, in addition to those better known in the southeastern portion; of the developments within the past year, none are more interesting than the deposits worked in Bates county, in the vicinity of Rich Hill. A year ago this place was hardly known, and it has already developed a trade of two thousand tons daily. There seems to be in reality no sign of limit to coal in the Rich Hill coal belt, and with the necessary help to facilitate mining or production, with the means at hand to transport the coal to distant markets there is no reason why a thousand or more car loads may not be shipped out every day during the next dozen or twenty years. The coal is here in amazing quantity and splendid quality. All that is wanted is capital and men to mine it, and then the means of transportation available, to ship thousands of tons of it per month. As to new coal discoveries, borings show plenty of coal almost anywhere in this coal belt, the veins being from two to six feet. At a few miles east of Rich Hill, there was struck a vein six feet in thickness. At Carbon Center, at forty feet below the town site, a bed of coal three feet and seven inches thick was found. This coal field is only ninety miles from Kansas City, and three hundred miles to St. Louis. The Missouri River, and the Southern Missouri railroads extend to and through the district, and the Chicago and Alton, and the Burlington and Southwestern roads are making a movement toward this important coal field.



## KENTUCKY COAL OUTPUT.

This State is endowed with two distinct coal fields; the output from the western field forms the largest proportion of the sum total. We set the output of the whole State down as at least one million tons. In the western field the most persistent and uniform coal of the series is D, or No. 9; it is from four to six feet thick, averaging five feet. It is an excellent coal for grate and furnace, and gives a good coke. A lot of slack from this vein, from St. Bernard mines, Earlington, Ky., washed and coked, gave a bright, firm coke, with only one per cent. sulphur. The Louisville and Nashville last year carried 140,000 tons out of the eastern coal field. There is also coal sent out via the Kentucky and Cumberland rivers and the Ohio, from Boyd and Lawrence counties, beside local use. We credit the eastern coal field with 300,000 tons for 1880.

Details of the production of the western coal field are given below:—

	<i>Tons, 1878.</i>	<i>Tons, 1879.</i>	<i>Tons, 1880.</i>
Mines on Evansville, Henderson and Nashville R. R.....	163,698	157,150	192,047
Mines on Paducah and Elizabeth Railroad.....	190,000	217,617	234,963
Mines on Green river.....	80,000	82,500	100,000
Mines on Ohio River, below Green River.....	84,000	79,600	82,000
Mines on Ohio River, above Green River.....	50,000	82,500	80,000
Grand total.....	567,698	619,367	689,010

There will be a large increase in the output of coal in the western coal field during 1881. Of the coal carried by the E. H. & N. R. R., and P. & E. R. R. last year, the St. Bernard Coal Co., produced 201,434 tons. This company is using the Harrison coal cutting machine in its mines.

## COAL TRADE OF THE UNION.

We give below the tonnage for the year 1869, as per census reports made in 1870, together with official figures for the year 1880, where available; in other cases, we have made a careful estimate based upon our reports of the trade in the various States:—

	<i>Tons, 1869.</i>	<i>Tons, 1880.</i>
Pennsylvania Anthracite.....	13,866,180	23,437,242
Pennsylvania Bituminous.....	7,798,517	19,000,000
Illinois.....	2,629,563	4,000,000
Ohio.....	2,527,285	7,000,000
Maryland.....	1,819,824	2,136,160
Missouri.....	621,930	1,500,000
West Virginia.....	608,878	1,400,000
Indiana.....	437,870	1,196,490
Iowa.....	263,437	1,600,000
Kentucky.....	150,582	1,000,000
Tennessee.....	133,418	641,042
Virginia.....	61,803	100,000
Kansas.....	32,938	550,000
Oregon.....		200,000
Michigan.....	21,150	35,000
California.....		600,000
Rhode Island.....	14,000	15,000
Alabama.....	11,000	340,000
Nebraska.....	1,425	100,000
Wyoming.....	50,000	225,000
Washington.....	17,344	175,000
Utah.....	5,800	275,000
Colorado.....	4,500	575,000
Georgia.....		100,000
Total.....	31,116,595	66,200,934

## GREAT BRITAIN.

The quantity of coal produced in Great Britain, is stated by the keeper of the mineral statistics to be 134,008,288 tons for the year 1879. The returns for the year 1880 will not come in until about August of this year. Production has grown fully sixty per cent. in twenty years. The total in 1860 was 83,200,000 tons, with an export trade of 7,400,000 tons. The total exports of coal during 1880 (including coal for steamers engaged in the foreign trade—4,926,076 tons) were 23,628,627 tons, or rather more than the amount of Anthracite coal marketed in the United States, during the same period of time. We append a few details of the coal production.

1870.....	112,875,725 tons.	1876.....	133,344,766 tons.
1871.....	117,352,028 tons.	1877.....	134,610,763 tons.
1872.....	123,386,750 tons.	1878.....	132,607,866 tons.
1873.....	127,012,767 tons.	1879.....	134,008,288 tons.
1874.....	125,043,257 tons.		
1875.....	131,867,105 tons.		

The number of collieries in operation, was 3,877, and the number of persons employed was no fewer than 476,810. The coal raised, was produced in the districts, as below :—

District.	Tons.	District.	Tons.
North Durham and Northumberland	12,245,597	Shropshire.....	854,380
Cumberland.....	1,459,170	Gloucestershire.....	1,250,718
South Durham.....	17,306,482	Somersetshire.....	767,930
Westmoreland.....	4,697	Monmouthshire.....	4,640,430
Cheshire.....	720,350	NORTH WALES.—Flintshire.....	720,697
Lancashire, North and East.....	9,020,645	Denbighshire.....	1,498,985
Lancashire, West.....	9,591,700	SOUTH WALES.—Glamorganshire.....	12,359,180
Yorkshire, West Riding.....	16,024,249	Camarthenshire.....	630,697
Yorkshire, North Riding.....	6,695	Pembrokeshire.....	85,000
Derbyshire.....	7,450,370	Brecknockshire.....	51,520
Nottinghamshire.....	4,249,242	SCOTLAND, East.....	11,300,567
Warwickshire.....	1,060,016	SCOTLAND, West.....	6,169,360
Leicestershire.....	1,035,016	IRELAND.....	129,000
Staffordshire, South.....	9,350,000		
Staffordshire, North.....	4,025,535		

The receipts of coal at London, for a series of years, have been as below :—

YEAR.	By Sea.	By Canal.	By Rail.	Total.
1871.....	2,762,712	6,615	4,449,141	7,218,468
1872.....	3,548,918	8,236	4,999,268	7,556,422
1873.....	2,665,630	11,195	5,147,413	7,824,288
1874.....	2,727,719	5,982	4,689,785	7,423,486
1875.....	3,134,846	4,594	5,065,452	8,204,892
1876.....	3,273,443	4,696	5,173,237	8,451,375
1877.....	3,170,601	4,608	5,426,204	8,501,413
1878.....	3,198,309	2,977	3,593,290	8,794,576
1879.....	3,508,526	2,910	6,547,395	10,058,811
1880.....	3,714,708	508	6,200,272	9,915,488

Of the receipts in 1880, some 2,447,344 tons were afterward conveyed beyond the limits, leaving 7,468,144 tons as consumed in the city.

The exportations have been as below :—

Year.	Tons.	Year.	Tons.
1871.....	12,851,957	1876.....	16,299,077
1872.....	13,211,961	1877.....	15,420,050
1873.....	12,712,222	1878.....	15,483,816
1874.....	13,927,205	1879.....	16,435,642
1875.....	14,475,036	1880.....	18,702,551

## NOVA SCOTIA.

The Inspector of Mines, EDWIN GILPIN, furnishes the following summary of the *coal sales* of Nova Scotia, since the beginning of the industry in that province.

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1785—1790.....	14,349	For 1871.....	596,418
1791—1800.....	51,048	For 1872.....	785,914
1801—1810.....	70,452	For 1873.....	881,106
1811—1820.....	91,527	For 1874.....	749,127
1821—1830.....	140,820	For 1875.....	706,795
1831—1840.....	839,981	For 1876.....	634,207
1841—1850.....	1,533,798	For 1877.....	687,065
1851—1860.....	2,998,829	For 1878.....	693,511
1861—1870.....	4,927,339	For 1879.....	688,624
Total to 1871.....	10,069,143	For 1880.....	954,659

The duty on the coal imported into the United States from Nova Scotia is seventy-five cents per ton, gold, on the round or coarse coal, and forty cents per ton, on the culm or slack; that is the coal which passes through bars not wider than three-quarters of an inch. About ten per cent. of the coal sold is culm. We give below the duty at various dates:—

1846 to 1862.....	.24 per cent. ad valorem.
1862-3-4.....	\$1.00 per ton.
1865.....	1.10 per ton.
1866-1872.....	1.25 per ton.
1872 to date.....	.75 per ton.

Reciprocity Treaty in force from June, 1854, to March, 1866.

Number of tons actually raised during a term of years:—

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1865.....	715,786	1873.....	1,051,467
1866.....	664,998	1874.....	872,720
1867.....	517,525	1875.....	781,165
1868.....	462,188	1876.....	709,646
1869.....	578,062	1877.....	757,496
1870.....	625,769	1878.....	770,603
1871.....	673,242	1879.....	788,271
1872.....	880,950	1880.....	1,032,710

The destination of the coal sold during the year 1880, together with a comparison of the "markets" is shown below:—

<i>Markets.</i>	1880— <i>Tons.</i>	1879— <i>Tons.</i>	1878— <i>Tons.</i>	1877— <i>Tons.</i>	1876— <i>Tons.</i>
Nova Scotia.....	352,913	278,120	279,172	255,790	225,658
Quebec.....	239,091	154,118	88,710	95,118	117,303
New Brunswick.....	97,817	84,731	115,245	104,818	101,890
Newfoundland.....	69,626	57,651	61,361	49,342	51,742
P. E. Island.....	46,767	44,891	43,412	45,169	46,908
United States.....	123,423	51,641	88,495	118,216	71,634
West Indies.....	12,165	10,124	16,999	13,660	7,971
South America.....	.....	.....	523	573	.....
Europe.....	12,857	7,348	3,594	4,379	1,101
<b>Total</b> .....	<b>954,659</b>	<b>688,624</b>	<b>693,511</b>	<b>687,065</b>	<b>634,207</b>

## COAL IN BELGIUM.

The progress of the extraction of coal has been as below, in metric tons of 2,204 lbs.

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1830.....	2,345,797	1869.....	12,943,994
1835.....	2,557,097	1870.....	13,697,118
1840.....	3,929,962	1871.....	13,733,176
1845.....	4,919,156	1872.....	15,658,948
1850.....	5,820,884	1873.....	15,778,401
1855.....	8,409,330	1874.....	14,669,029
1860.....	9,609,895	1875.....	15,011,331
1865.....	11,840,703	1876.....	14,329,578
1866.....	12,774,662	1877.....	13,938,523
1867.....	12,755,822	1878.....	14,899,175
1868.....	12,298,589	1879.....	15,446,531

Artificial Fuel is made to the extent of perhaps half a million tons annually. The consumption of coal within the State is something like ten and a half million tons. To produce this coal there were 95,902 workmen employed in 291 mines, during the year 1879: this is a very favorable showing as compared with 1878. Average wages paid to coal miners during the year, was 2 *frs.* 80 *centimes*, or say fifty-six cents per day. This is cheap labor. There was an export trade of about 4,000,000 tons to France and Germany, and an importation of 1,100,000 tons from Great Britain.

## COAL IN FRANCE.

Statistics of the output are given below, in metric tons of 2,204 lbs.

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1789.....	215,000	1871.....	13,240,185
1802.....	844,180	1872.....	16,100,773
1811.....	773,694	1873.....	17,485,786
1820.....	1,093,658	1874.....	17,059,547
1830.....	1,862,665	1875.....	16,949,032
1840.....	3,003,382	1876.....	17,104,794
1850.....	4,433,567	1877.....	16,877,200
1860.....	8,309,622	1878.....	16,960,416
1865.....	11,652,765	1879.....	17,104,485
1870.....	13,179,708		

There was also 520,038 tons of lignite or brown coal, from the Aix district, raised in 1879; the district of Valenciennes turned out 7,251,969 tons of coal, that of the Loire 3,050,177 tons, and Alais 1,797,837 tons. The consumption of coal in France amounts to something like 24,000,000 tons annually, as the exports are 700,000 tons, and the imports are 8,000,000 tons. Of the exports Belgium takes 10%; Switzerland takes 14%; Italy 36%; and there is sent coastwise and foreign the remaining 40%. Of the imports Belgium furnishes 50%; England 36%; and Germany 14%. What is called Anthracite is found in the departments of the Nord, Sarthe, Mayenne, Isere, and Calvados, and the output is one and a quarter million tons. Lignite is found in Isere, Haute-Saone, Vaucluse and Bouches-du-Rhone. In the other basins coal only is mined. Something like two million tons is made into coke annually. Large amounts of artificial fuel are made annually from the slack or debris.



## COAL IN AUSTRIA.

In this country coal mining dates back to the year 1550. In 1819, it had amounted to 94,607 tons; in 1825, to 154,944 tons; in 1830, to 211,298 tons; in 1835, to 250,782 tons; in 1840, to 469,212 tons; in 1845, to 721,707 tons; in 1850, 944,323 tons; in 1855, 2,101,050 tons; in 1860, 3,496,495 tons; in 1865, 5,069,303 tons. The Lignite and Coal is separated and the following table shows the progress of the industry.

<i>Yearly product in metric tons.</i>	<i>Coal.</i>	<i>Lignite,</i>	<i>Total.</i>
1870.....	4,295,775	4,000,169	8,355,944
1871.....	4,969,980	5,078,068	10,048,038
1872.....	4,788,455	5,767,612	10,556,067
1873.....	5,171,189	6,732,884	11,904,073
1874.....	5,096,659	7,183,098	12,279,757
1875.....	5,185,234	7,666,812	12,852,046
1876.....	5,664,331	7,798,255	13,362,586
1877.....	5,480,311	8,771,727	14,252,038
1878*	5,078,219	7,241,103	12,319,322
1879*	5,378,605	7,905,935	13,284,540

Upwards of 1,500,000 tons of Prussian coal is received, and 2,750,000 tons of coal is exported, mainly to Germany. Thus, the consumption within the State is 14,250,000 tons.

\*Does not include output in Hungary. The total for 1879, is stated to have been 15,447,292 tons.

## COAL IN RUSSIA.

Coal mining in Russia has not met with any great attention; from the amount of wood available. The supply of mineral however, is something enormous, and calculations have been made showing a supply equal to possible demands, for thousands of years. We are enabled to give the following statistics of the production. It will be noticed that the coal industry is developing in this country.

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1867.....	437,625	1875.....	1,709,269
1871.....	829,745	1876.....	1,823,128
1872.....	1,097,864	1877.....	1,600,000
1873.....	1,170,979	1878.....	2,484,423
1874.....	1,369,025	1879.....	3,578,604

Metric tons, 2,204 lbs.

Of the production in 1878, 2,013,397 tons is classed as coal, 453,415 tons Anthracite (84½ to 95½% of carbon) and 17,611 tons Lignite. The Anthracite is from the Donetz district, in the Department of the Don-Cossacks. We have not the details for 1879.

No coal is exported, but the imports reach up to 1,800,000 tons; the English furnishing three-fifths of this quantity, the remainder being from Germany. The exports from Great Britain to Russian ports during the year 1880, footed up 1,498,426 tons.

IN SWITZERLAND, in the Valais, is found Anthracite coal with the following component parts by analysis: Carbon, 88.16; hydrogen, 2.15; oxygen and nitrogen, 1.34; ash, 8.35. The quantity of coal used in the country, is 500,000 tons annually, and it is all imported.

## COAL IN THE GERMAN EMPIRE.

This country, as now consolidated, is one of the largest producers of coal in Europe. Since 1870, the Empire includes old Prussia, Saxony, Bavaria, and the States of the Zollverien. The product of coal of all kinds in the whole of the German States, amounts to something like fifty million tons annually. The grand total of the output in 1871, when the consolidation of the Empire was completed, was 37,852,464 tons of 2,240 lbs. Of the quantity now sent out of the pits, Prussia is to be credited with 89%.

## OUTPUT OF COAL IN THE EMPIRE, AS NOW CONSTITUTED.

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1848.....	4,383,585	1873.....	36,392,280
1857.....	11,279,266	1874.....	35,918,614
1867.....	23,808,071	1875.....	37,436,368
1868.....	25,704,758	1876.....	38,454,428
1869.....	26,774,368	1877.....	33,672,025
1870.....	26,397,770	1878.....	35,500,167
1871.....	29,373,272	1879.....	37,674,648
1872.....	33,306,418		

## OUTPUT OF LIGNITE IN THE EMPIRE AS NOW CONSTITUTED.

1848.....	1,417,420	1873.....	9,752,914
1857.....	3,587,855	1874.....	10,739,532
1867.....	6,994,818	1875.....	10,367,686
1868.....	7,174,365	1876.....	11,096,034
1869.....	7,569,545	1877.....	8,636,597
1870.....	7,605,234	1878.....	8,341,366
1871.....	8,482,838	1879.....	9,278,354
1872.....	9,018,048		

The persons employed in the coal mines in 1879, numbered 118,819, and 29,120 persons above ground; in the lignite mines 10,411 miners, and 8,182 persons above ground were employed. The colliery consumption of coal is stated to have been 2,586,324 metric tons.

## COAL IN NEW SOUTH WALES.

One of the most important coal-producing countries of the globe is that portion of Australia, known as New South Wales; the trade has sprung up within a very few years, and the outlook for the trade is most encouraging, as the coal has been found equal to the English steam coal, and adopted by the Home government; the approximate area of the coal fields is 24,840 square miles; the production from the opening of the mines up to the year 1874, amounted to 12,387,279 tons. Production has been as below:—

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1829.....	780	1873.....	1,002,862
1839.....	21,283	1874.....	1,261,351
1849.....	48,516	1875.....	1,253,475
1859.....	308,213	1876.....	1,319,918
1869.....	919,774	1877.....	1,444,171
1870.....	868,564	1878.....	1,575,926
1871.....	898,784	1879.....	1,750,000
1872.....	1,012,426		

## THE COAL PRODUCTION OF THE WORLD.

We have tabulated the following schedule, from the best sources, and the figures may be taken as essentially correct:—

<i>Countries.</i>	<i>Square miles. of Coal Area.</i>	<i>Tons, 1870.</i>	<i>Tons, 1878.</i>	<i>Tons, 1879.</i>
Great Britain.....	11,900	110,431,192	132,607,856	134,008,288
United States.....	192,000	32,863,690	49,130,584	59,808,398
Germany.....	1,770	34,003,004	43,841,533	46,953,002
France.....	2,086	13,179,708	16,960,416	17,104,485
Belgium.....	510	13,697,118	14,899,175	15,446,531
Austria.....	1,800	8,355,944	14,500,000	15,447,292
Russia.....	30,000	829,745	2,484,423	3,578,604
Spain.....	3,501	661,927	765,000	775,000
Nova Scotia.....	18,000	625,769	788,000	.....
Australia.....	24,840	868,564	1,575,926	1,750,000
India.....	2,004	500,000	4,000,000	4,000,000
Japan.....	5,000	.....	600,000	750,000
Vancouver's Island.....	390	29,863	228,974	250,000
Chili, 50,000, Sweden, 90,000 Italy, 220,000, China, 4,000,000.....				4,360,000

IN SWEDEN, the total output of coal is not over 90,000 tons annually, but there is imported from Great Britain, something over a million tons annually; the figures for 1880 being 1,317,274 tons.

ITALY produces perhaps 125,000 tons of lignite, and 95,000 tons of peat annually; beside this there is imported from Great Britain a million and a half tons of coal; the figures for 1880, were 1,531,009 tons.

IN CHILE the coal is of a lignitic character, and amounts to a yearly business of 400,000 tons, of which 50,000 tons are exported. In addition to the home supply 150,000 tons are imported from Great Britain annually.

SPAIN is reported to consume 1,500,000 tons of coal annually; the output is 750,000 tons, and 35,000 tons lignite, while the imports average 750,000 tons; the exports during 1880 from Great Britain amounted to 895,239 tons.

JAPAN.—The production in 1874, was stated at 396,240 metric tons; and for 1875, 436,826 tons. We make an estimate of 600,000 tons as for 1879. In 1868 Japan exported 15,584 tons of coal, and 915 tons for ships' use, but in 1878 the export of coal was 95,064 tons, with 111,785 tons for the use of vessels.

IN INDIA the amount of coal raised varies a good deal from year to year with a supply of sea-borne coal in the market, the latter depending very much on the amount of tonnage available. The supply of coals which had been imported from Australia to India during the last twenty years has nearly dwindled to nothing. The consumption in British India per annum in locomotives and factories is stated by one authority as being at present 1,000,000 tons, of which one-half was raised from Indian mines, the remainder coming from England, France and Australia. Other authorities give four millions as the production of native coal.

## IMPORTS AND EXPORTS OF COAL.

The tariff from 1824 to 1843, was six cents per bushel, or \$1.68 per ton; from 1843 to 1846, \$1.75 per ton; 1846, 30% ad valorem; 1847 to 1861, 24% ad valorem; 1862-3-4, \$1.00 per ton; 1865, \$1.10; 1866 to 1872, \$1.25 per ton; since August, 1872, 75 cents per ton. During the period from June, 1854, to March, 1866, the Reciprocity treaty was in force, and coal from the British possessions in North America, was admitted into the United States, duty free. The imports are from Australia and British Columbia to San Francisco; from Great Britain to the Atlantic and Pacific coasts; from Nova Scotia to Atlantic coast ports. Exports are mainly from the Lake, and Atlantic shipping ports to the Canadian Provinces, and to the West Indies.

The imports and exports for the calendar years named, have been as below:—

	1875.	1876.	1877.	1878.	1879.
IMPORTS, Bituminous.....	411,723	488,132	498,275	566,938	449,167
EXPORTS, Anthracite.....	361,669	362,044	377,979	312,273	421,992
Bituminous.....	234,997	253,387	324,839	345,347	221,371

We append a detailed statement of the exports from the United States, for the year ending June 30, 1880.

<i>Countries.</i>	<i>Anthracite.</i>	<i>Bituminous.</i>
Austria.....	131	.....
Belgium.....	.....	500
Brazil.....	250	817
Central American States.....	407	331
Chili.....	298	.....
China.....	2,691	.....
Danish West Indies.....	1,938	2,271
France.....	100	373
French West Indies.....	454	3,121
Miquelon, Langley, and St. Pierre Islands.....	754	.....
French Poss. in Africa and adjacent islands.....	50	.....
England.....	6	2,566
Gibraltar.....	.....	480
Nova Scotia, New Brunswick, and P. Edward Island.....	36,228	2,441
Quebec, Ontario, Manitoba, and N. W. Ter.....	320,726	129,217
British Columbia.....	75	51
Newfoundland and Labrador.....	899	10
British West Indies.....	1,950	861
British Possessions in Australasia.....	33	.....
Hawaiian Islands.....	838	84
Hayti.....	22	.....
Italy.....	200	.....
Japan.....	1,533	.....
Mexico.....	1,664	8,088
Dutch West Indies.....	2	.....
Dutch East Indies.....	307	.....
Peru.....	290	.....
Azore, Madeira, and Cape Verde Islands.....	21	.....
San Domingo.....	570	10
Spain.....	.....	350
Cuba.....	15,423	52,979
Porto Rico.....	122	.....
Sweden and Norway.....	475	.....
United States of Columbia.....	1,542	17,268
Venezuela.....	387	821
All other countries and ports in Africa, n. e. s.....	10	.....
All other islands and ports, n. e. s.....	2,230	.....
<b>Total.....</b>	<b>392,626</b>	<b>222,634</b>



Philadelphia takes 2,250,000 tons of fuel for heat and steam annually. The Reading delivers a million tons of coal from mines on its line, and there is three-quarters of a million of Lehigh and Wyoming coal taken in by various routes. Bituminous is at least half a million tons. It must be remembered that the manufacturing enterprises within this city are very numerous.

The Anthracite Fuel Company, at Rondout, N. Y., made and sold 155,000 gross tons of fuel, from the time of starting in 1876, to the end of 1880. The works are not run during the winter season.

In France, there was a total of 117,609 men employed in coal and iron mines in 1878; during the year 173 men were killed, and 1,141 injured. For the number of employees these figures show very small percentages of fatalities or injuries.

The year 1881 promises to be one of steady work for the rail mills of the United States. With the completion of 7,200 miles of new railroad in 1880, there was a consumption of 864,000 tons of rails, beside 635,000 for renewals of old lines. At least 8,000 miles of new line will be laid in 1881. The capacity of the home Bessemer mills is 1,000,000 tons of rails a year. The iron rail mills turned out 450,000 tons in 1880.

Coal is mined from great depths; thus the Adelbert shaft, in Bohemia, is 3,280 feet from bank to sump, and the bottom is 1,548 feet below the level of the sea. At Gilly in Belgium, are two shafts, 2,847 feet. One at Lugan, Saxony, is 2,653 feet deep. At Rosebridge colliery, near Wigan, England; the winding shaft is 2,458 feet deep, and the cage is hoisted in 55 seconds.

The mines of Ohio are of three kinds—drifts, shafts, and slopes; and the commissioner estimates that by the wasteful system of mining—by pillar and room—mostly in vogue in Ohio, at least 40 per cent. of the coal is lost by being left in the mines after they have been worked over, in the shape of crushed and abandoned pillars. While the coal fields of Ohio are in no special danger of being worked out in any reasonable time, the commissioner deems it his duty to suggest that such wastefulness is undesirable, and that much of the waste could be avoided by long-wall working.

During the census year, ending May 31, 1880, it was stated that 1,570,688 tons of Anthracite; 377,038 tons domestic Bituminous; and 32,504 tons English and Nova Scotia coal was received at Boston. Of this 184,140 tons of Anthracite and Bituminous went to Chelsea and places on the rivers, and 563,211 tons were carried out of Boston by rail, thus leaving for the local consumption some 1,232,879 gross tons of coal of all kinds.

In the coal trade of New York City, on page 49, the tonnage that is sold by wholesale dealers to go to outside ports and places is not included. Cumberland, Clearfield and Anthracite carried by the Pennsylvania Railroad Company is shipped at South Amboy; Anthracite by the Central Railroad of New Jersey at Elizabethport and Port Johnston; Anthracite by the D. L. & W. R. R. at Hoboken; Anthracite by the 'Erie' (Pittston and Lackawanna) at Weehawken. All the points are on the New Jersey side of the Hudson river, and the coal shipped therefrom is sold by New York dealers. Probably ten millions of tons of coal are annually sold by the wholesale houses, for shipment, north, east and south, beside the tonnage for local use.

## COAL CUTTING BY MACHINERY.

One of the problems to be solved at a coal mine, is the cost of putting a ton of coal on the cars of the railroad company, leading from the mines to market. Manual labor is the prime factor and it is affected by many whims and vagaries. When times are hard for the coal operator, there is no talk of striking, by the men employed at and about the mines. But when the condition of affairs shows the slightest symptom of an improvement, the first thing is to see what higher wages can be had for the services rendered. It is to this uneasy condition of affairs, in all times and in all countries, that the attention of many practical minds has been called to the introduction of machinery as a substitute for manual labor. One of the machines introduced in this country, is the Harrison Mining Machine.

The machine itself consists of a small compressed air engine, with a  $3\frac{1}{2}$  inch cylinder, 11 inch stroke; to the piston rod is attached a pick that moves with the rate of 240 strokes per minute. The engine rests upon an axle having two small broad wheels, which serve to move the machine forward, and from place to place as the undercutting is done. There is no track necessary. The machine weighs something like two hundred pounds. The power exerted to run this machine is less than one-horse power; the engines used for operating the hoisting rope in use in the slope or shaft will furnish sufficient power to run the air compressor, which supplies the motive power for the coal cutting machines. The Morris Run Coal Co., at Morris Run, Pa., have a duplex compressor, 18 in. diameter of cylinder and 24 in. stroke, for use in running the Harrison Mining Machine. The compressed air is conveyed down the main entry in iron pipes, and then led off to where the coal cutter is at work, through rubber hose.

We have seen this machine undercut a yard of coal—along the face—in five minutes. The cut is  $4\frac{1}{2}$  feet in, and the depth at the face is something like seven inches, and at the back, one inch. Two men are needed to hold the machine up to its work, and guide it properly, and one boy to clean the slack away from the cutter. With this assistance, and in two shifts of nine hours each, eighty tons of coal per day is cut. It does not require skilled labor to operate, in any sense of the word. The machine is in operation in several States of the Union, cutting coal, and it has given satisfaction in every way.

## UNDERGROUND HAULAGE OF COAL.

The use of the tail rope system for drawing coal along the gangways in mines, can be applied with less cost and greater facility in the Anthracite coal mines of Pennsylvania than any other system yet devised. The system has received considerable attention, and there is now in working operation at the colliery of the Buck Mountain Coal Co., a rope that hauls the coal a distance of half a mile underground along the gangway to the bottom of the slope. Twenty cars are drawn out at one time, and a thousand tons a day can easily be handled by the stationary engine and three men or boys. This place gives the system a severe test from the crookedness of the road, short curves, reverse curves and a rock-bound gangway. It has been in use for over a year, and has given satisfaction in every respect. The Roebling Sons Co., at Trenton, N. J., are prepared to supply the rope and fixtures for this system.

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## **THE COAL MINES OF PENNSYLVANIA.**

**Anthracite and Bituminous.**

AMOUNT PRODUCED, NAMES OF THE MINES, LOCATION OF THE MINES,  
NAMES OF THE OPERATORS, RAILROADS OVER WHICH THE  
PRODUCT IS SENT TO MARKET.

Published by FREDERICK E. SAWARD, Editor of THE COAL TRADE JOURNAL,  
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**Price, - - - - - One Dollar.**

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**A Compendium of Valuable Information**

RELATIVE TO

Coal Production, Prices, Transportation, Etc.

**AT HOME AND ABROAD.**

WITH

Many Facts Worthy of Preservation for Future Reference.

CORRECTED TO THE LATEST DATES.

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BY FREDERICK E. SAWARD,

Editor of "THE COAL TRADE JOURNAL"

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1882.

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# THE COAL TRADE.

## INTRODUCTION.

We present herewith our Ninth Annual Review of the Coal Trade, at home and abroad. Continued prosperity throughout the entire country last year, and the industrial progress met with, made it possible that a largely increased output of all varieties of coal should be recorded. Prices were well maintained and they averaged higher than in 1880. The output in the United States is now one-half of that in Great Britain. There is of course a large increase in Bituminous coals in the belt of States, where the manufactures cluster so thickly about the source of supply. We introduce here a comparative table of the output in several States; the figures are based upon careful reports received from various sources.

	<i>Tons 1880.</i>	<i>Tons 1881.</i>
Pennsylvania Anthracite.....	23,437,242	28,500,016
Pennsylvania Bituminous.....	19,000,000	20,000,000
Illinois.....	4,000,000	6,000,000
Ohio.....	7,000,000	8,250,000
Maryland.....	2,136,160	2,261,918
Missouri.....	1,500,000	1,750,000
West Virginia.....	1,400,000	1,500,000
Indiana.....	1,100,000	1,500,000
Iowa.....	1,600,000	1,750,000
Kentucky.....	1,000,000	1,100,000
Tennessee.....	600,000	750,000
Virginia.....	100,000	100,000
Kansas.....	550,000	750,000
Michigan.....	75,000	100,000
Rhode Island.....	10,000	10,000
Alabama.....	340,000	375,000
Washington.....	175,000	175,000
Wyoming.....	225,000	225,000
Utah.....	275,000	275,000
Colorado.....	575,000	700,000
Georgia.....	100,000	150,000
Total.....	65,198,402	76,121,934

There is valuable matter in this annual that has not heretofore appeared, and we trust that it will be appreciated by all who use or traffic in coal. In the comparative tables of the output in the several countries, states, districts, etc., there is the germ of many useful and interesting calculations, as to the advancement of the communities particularly dependent thereupon. The favor with which our previous efforts have been received, lead us to expect the same kindly reception of this present venture.



## ANTHRACITE COAL.

We present in this edition facts and figures connected with the Anthracite coal trade, to the end of the calendar year 1881. The business was profitably carried on, and the average net result was better than in the preceding year. The grand total shipped from the mines to market was 28,500,016 gross tons. Of this quantity, there was 57.2 per cent. delivered at points short of tide-water. As compared with the preceding year this is a decrease, inasmuch as the increase in the production was 5,062,774 tons, and the amount delivered at tide was only 2,081,000 tons greater. In our preceding yearly reports, we called attention to the growing trade in Anthracite coal at points west and north of the State wherein it is produced, and the fact is yearly being developed that the quantity of Anthracite coal called for to supply this western trade will make the price of coal at tide. The experience of the fall season in last year was but a foretaste of what may be expected. All the reports that we have from the direction named—west and north—show that the coal will be taken in increasing quantities each year. The new lines of railway leading from the Anthracite regions are all tending in that direction, and every effort is being made by the several parties in interest, to promote trade with the vast territory which is now so rapidly being filled up with a population which of necessity requires fuel to maintain its industrial and domestic economy.

Of the output in 1881, 13,951,383 tons 48.96 p.c. was Wyoming coal; 5,294,676, or 18.58 p.c. was Lehigh coal, and 9,253,958, or 32.46 p.c. was from the Schuylkill region. Reference to the tabular statements will show that the Wyoming region has developed more rapidly than the others; this is due to the facilities afforded for shipping coal in all directions. In the aggregate, the output for last year, is nearly four-fold of that twenty years ago. By many well informed operators it is not considered at all probable that the yearly capacity, is above thirty millions of tons per year. There was very little time lost at the Anthracite mines during last year. In the first six months, or until the fourth of July, work was carried on for 104 days, and after that date, there was work each and every working day. Labor in the several regions is largely paid on the basis of the selling price of the coal in market, therefore there is no complaint when these stoppages are ordered. The price of coal varied very little during the year from the opening to the close.

A recapitulation of the monthly output is given herewith:—

<i>Month.</i>	<i>Tons 1879.</i>	<i>Tons 1880.</i>	<i>Tons 1881.</i>
January.....	1,441,751	1,764,316	1,672,645
February.....	1,578,246	1,296,570	2,118,174
March.....	1,936,912	1,746,872	2,225,841
April.....	2,071,270	2,016,640	1,945,855
May.....	2,397,569	1,651,080	2,086,742
June.....	2,462,218	1,836,640	2,418,239
July.....	2,403,893	1,636,795	2,572,099
August.....	2,331,405	1,895,516	2,733,548
September.....	2,417,581	2,842,478	2,588,219
October.....	2,641,751	2,378,810	2,686,053
November.....	2,385,665	2,492,664	2,727,872
December.....	2,074,404	1,878,858	2,724,726
<b>Totals.....</b>	<b>26,142,639</b>	<b>23,437,242</b>	<b>28,500,016</b>

## THE PRODUCTION OF ANTHRACITE COAL.

The shipment of Anthracite as reported by J. H. Jones, accountant of the Anthracite coal statistics, was as stated below. Coal used in and about the mines not included in these statements; the amount will average eight per cent., of the shipments.

<i>Year.</i>	<i>Schuylkill.</i>	<i>Lehigh.</i>	<i>Wyoming.</i>	<i>Total.</i>
1862.....	3,372,583	1,351,054	3,145,770	7,869,407
1863.....	3,911,683	1,894,713	3,759,610	9,566,006
1864.....	4,161,970	2,051,669	3,960,836	10,177,475
1865.....	4,366,959	2,040,913	3,254,519	9,652,391
1866.....	5,787,903	2,179,364	4,736,616	12,703,882
1867.....	5,161,671	2,502,054	5,325,000	12,988,725
1868.....	5,330,737	2,502,582	5,968,146	13,801,465
1869.....	5,775,138	1,949,673	6,141,363	13,866,180
1870.....	4,968,157	3,239,374	7,974,660	16,182,191
1871.....	6,552,772	2,235,707	6,911,242	15,699,721
1872.....	6,694,890	3,873,339	9,101,549	19,669,778
1873.....	7,212,631	3,705,636	10,309,755	21,227,952
1874.....	6,866,877	2,773,836	9,504,408	20,145,121
1875.....	6,281,712	2,834,605	10,596,155	19,712,472
1876.....	6,221,934	3,854,919	8,424,158	18,501,011
1877.....	8,195,042	4,332,760	8,300,377	20,828,179
1878.....	6,282,226	3,237,449	8,065,587	17,605,262
1879.....	8,960,329	4,595,567	12,586,293	26,142,689
1880.....	7,554,742	4,463,221	11,419,279	23,437,242
1881.....	9,253,958	5,294,676	13,951,383	28,500,016

## DIVISION OF SHIPMENTS 1880-1881.

<i>Interest.</i>	<i>Tons 1881.</i>	<i>Tons 1880.</i>
Philadelphia and Reading Railroad.....	6,940,383	5,933,923
Lehigh Valley Railroad.....	5,721,869	4,394,633
Central Railroad of New Jersey.....	4,085,423	3,470,141
Delaware, Lackawanna and Western Railroad.....	4,388,969	3,550,348
Delaware and Hudson Canal Company.....	3,211,406	2,674,704
Pennsylvania Railroad Company.....	2,211,363	1,864,032
Pennsylvania Coal Company.....	1,475,380	1,138,466
New York, Lake Erie and Western Railroad.....	465,230	411,094
<b>Totals.....</b>	<b>28,500,016</b>	<b>23,437,242</b>

The Pennsylvania Railroad interest includes Shamokin coal, Lykens Valley coal, and some Wyoming coal. Reading is of the various grades of Schuylkill. Lehigh Valley is three-fourth Lehigh, and balance Wyoming. Central Railroad of New Jersey is about equally divided between Lehigh and Wyoming. Delaware and Hudson; Delaware, Lackawanna and Western Company; Pennsylvania Coal Company, all from Wyoming region. 'Erie' coal is from Wyoming. In addition to this may be put 90,000 tons of Loyalsock Anthracite from Sullivan county. Details of the business of the various companies will be found on the following pages.

## THE LEHIGH VALLEY RAILROAD COMPANY.

The tonnage of this line increased during last year at a greater ratio than has heretofore been recorded. There is an activity along the entire route from the lakes to the Atlantic, that warrants the prophecy that it will always be the second in rank of the Anthracite coal carriers. We give details of the traffic :

<i>Received from.</i>	<i>Tons, 1878.</i>	<i>Tons, 1879.</i>	<i>Tons, 1880.</i>	<i>Tons, 1881.</i>
Wyoming region.....	9 9,712	1,135,587	1,162,706	1,362,706
Hazleton region.....	1,520,049	1,964,278	2,125,104	2,674,077
Beaver Meadow region.....	435,951	474,761	441,591	502,631
Mahanoy region.....	565,826	786,082	876,860	1,257,933
Miscellaneous.....	5,076	1,076	243	197
<b>Totals .....</b>	<b>3,446,615</b>	<b>4,361,785</b>	<b>4,606,415</b>	<b>5,791,376</b>

The distribution was as below :

<i>Year.</i>	<i>East of Mauch Chunk.</i>	<i>Total Coal Tonnage.</i>
1871.....	2,210,272	2,889,074
1872.....	3,009,395	3,850,118
1873.....	3,189,023	4,114,339
1874.....	3,016,636	4,150,659
1875.....	2,417,800	3,277,571
1876.....	3,129,895	3,951,513
1877.....	3,453,533	4,362,124
1878.....	2,778,756	3,446,615
1879.....	3,531,829	4,361,785
1880.....	3,774,729	4,606,415
1881.....	4,498,323	5,791,376

Of the quantity east of Mauch Chunk as noted above, there was 1,604,203 tons delivered to the New Jersey Division for shipment at Perth Amboy, an increase of two hundred thousand tons over the preceding year. There was also 1,257,176 tons delivered to the Belvidere Division of the Pennsylvania Railroad, for shipment at Trenton and South Amboy.

The rate of transportation was maintained at \$1.40 per ton, for the 101 miles from Mauch Chunk to Perth Amboy, throughout the year. Laterals to Mauch Chunk average fifty cents per ton. Prices of coal remained unchanged throughout the season of 1881, on tide-water deliveries, and the demand was active at all times for Lehigh coal with sales at a shade above the circular rates during November. Quotations were :

<i>Lump.</i>	<i>Broken.</i>	<i>Egg.</i>	<i>Stove.</i>	<i>Chestnut.</i>
\$5 25	\$4 45	\$4 45	\$4 25	\$4 00

Prices of coal at Mauch Chunk, for delivery 'on the line,' were evenly maintained throughout the season, and averaged \$3.10 per ton.

## PENNSYLVANIA AND NEW YORK RAILROAD.

This line forms the northern connection of the Lehigh Valley Railroad, for its business to the North and West. In addition thereto, it transports a large amount of Bituminous coal from what is known as the "Barclay" region. The Loyalsock coal mined in Sullivan county, Pa., is shipped over the State Line and Sullivan Railroad to Towanda and thence to market via this line and its connections. Tonnage has been as below :

Anthracite.....	In 1879—860,161 tons.	In 1880—705,464 tons.	In 1881—1,108,056 tons.
Bituminous.....	In 1879—329,901 tons.	In 1880—435,516 tons.	In 1881— 419,551 tons.

NOTE.—All above figures are for fiscal years, which end with November, and tons are 2,240 lbs,

## CENTRAL RAILROAD OF NEW JERSEY.

Coal carried over the Lehigh and Susquehanna Division of the Central Railroad of New Jersey.

1871.....	1,033,587	1877.....	2,969,788
1872.....	2,527,068	1878.....	2,390,655
1873.....	3,089,697	1879.....	4,088,964
1874.....	2,972,286	1880.....	3,843,209
1875.....	2,661,635	1881.....	4,627,286
1876.....	2,952,520		

The source of receipt of the coal carried during 1881, was as follows, in tons of 2,240 pounds:

WYOMING REGION.	Lehigh and Wilkes-Barre Coal Company.....	1,905,295
	Everhart Coal Company.....	59,939
	Fairmount Colliery.....	50,232
	Susquehanna Coal Company.....	225,803
	Delaware and Hudson Canal Company.....	38,997
	Red Ash Coal Company.....	92,595
	Lehigh Luzerne Coal Company.....	13,444
UPPER LEHIGH.	Upper Lehigh Coal Company.....	370,683
	M. S. Kemmerer & Company.....	128,237
	Pond Creek Coal Company.....	32,822
BEAVER MEADOW.	Lehigh and Wilkes-Barre Coal Company.....	479,261
	G. H. Myers & Company.....	76,339
SCHUYLKILL.	Alliance C. M. Co.....	473
M'UCH CHUNG,	Lehigh Coal and Navigation Company.....	645,338
CROSS CREEK.	Coxe Brothers & Company.....	226,155
COUNCIL RIDGE.	J. Leisenring & Company.....	139,033
LEHIGH VALLEY R. R.	Packerton.....	12,310
R. P. Smith & Company.	.....	130,323

	<i>Tons, 1880.</i>	<i>Tons, 1881.</i>
<i>Distribution.</i>		
Forwarded East by rail to Tidal points.....	2,180,571	2,570,448
Forwarded East by rail to Local points.....	922,183	1,213,630
Forwarded East by rail use Central Division.....	136,968	159,284
Forwarded East by rail use L. and S. Division.....	15,471	18,921
Delivered at and above Mauch Chunk.....	98,653	120,051
Delivered at Coalport for Canal.....	369,729	318,922
Delivered to Lehigh Valley Railroad at Packerton.....	95	227
Delivered to Lehigh Valley Railroad at Sugar Notch.....	119,537	225,803
Total.....	3,843,209	4,627,286

## LEHIGH COAL AND NAVIGATION COMPANY.

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1872.....	566,724	1877.....	550,519
1873.....	525,623	1878.....	430,987
1874.....	572,470	1879.....	701,761
1875.....	397,427	1880.....	617,989
1876.....	506,773	1881.....	645,338

This company dates back to 1820, as a mining and carrying company. The figures in the schedule above, are the figures of the production at the 'Summit mines.'



## LEHIGH AND WILKES-BARRE COAL COMPANY.

Year.	Tons.	Year.	Tons.
1874.....	2,479,382	1878.....	1,201,406
1875.....	2,085,038	1879.....	2,109,551
1876.....	2,300,555	1880.....	1,929,801
1877.....	2,196,864	1881.....	2,384,556

Since 1877, the coal from Summit Hill is not included, these mines being again under the management of the Lehigh Coal and Navigation Company.

## COAL TRADE OF THE NEW YORK CANALS.

The quantity carried on the State canals, in both directions, East and West, is stated by the Canal Auditor, to be as below:

QUALITY—Tons, 2,000 LBS.	1878.	1879.	1880.	1881.
Anthracite.....	681,400	810,517	762,593	902,214
Bituminous.....	207,319	160,538	136,213	16,935

## LOYALSOCK ANTHRACITE COAL PRODUCT.

This coal comes from Sullivan county, Pa., and is shipped over the State Line and Sullivan road to the P. & N. Y. R. R. This business is not included in the statistics elsewhere given :

1871.....	24,665 tons.	1876.....	30,000 tons.
1872.....	54,966 tons.	1877.....	23,000 tons.
1873.....	35,267 tons.	1878.....	37,000 tons.
1874.....	33,896 tons.	1879.....	50,000 tons.
1875.....	16,522 tons.	1880.....	65,000 tons.
1881.....	90,000 tons.		

## PENNSYLVANIA COAL COMPANY.

The output of coal from the mines of this company is yearly increasing, and the figures for 1881 show a larger business than ever before. Tide coal is received at Weehawken, N. J., and at Newburgh, N. Y., by the Erie Railway from Hawley. We append annual business :

1876.....	1,143,922 tons.	1879.....	1,427,150 tons.
1877.....	1,118,011 tons.	1880.....	1,133,466 tons.
1878.....	925,995 tons.	1881.....	1,427,747 tons.

The distribution during 1880 and 1881 was :

	Tons, 1880.	Tons, 1881.
West by Erie Railway.....	131,917	181,494
East by Erie Railway.....	986,723	1,239,990
East by D. & H. Canal.....	5,733	6,263

There was also considerable coal sent West via Hudson river and the Erie canal, as cars were not always to be had in sufficient supply. This company sells through a contract system, and the net result is fully up to the rate of other coals. We quote prices at Newburgh for 1881:

	Lump.	Grate.	Egg.	Stove.	Chestnut.
Pittston.....	\$3 95	\$3 85	\$3 80	\$4 05	\$3 90

The completion of the New York and New England Railroad to the Hudson river opposite Newburgh, will give the Pennsylvania Coal Company an outlet, 'all rail' for coal to many points not otherwise open to them.

## DELAWARE AND HUDSON CANAL COMPANY.

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1872.....	2,930,761	1877.....	1,929,248
1873.....	2,752,595	1878.....	2,144,120
1874.....	2,399,417	1879.....	3,054,390
1875.....	3,053,817	1880.....	2,712,910
1876.....	1,997,645	1881.....	3,114,496

The distribution has been as below:—

	<i>Tons, 1880.</i>	<i>Tons, 1881.</i>
Amount mined.....	2,712,910	3,211,496
Shipped South.....	59,399	76,866
To Oswego via Delaware, Lackawanna and Western.....	92,314	122,774
West via Erie Railway.....	388,262	585,596
North via Albany and Susquehanna.....	402,785	649,665
To Honesdale for sale and shipment.....	1,731,944	1,776,591

Adding the quantity transported for other parties—450,296 tons—this company carried over its railroads and canal 3,661,792 tons of Anthracite coal in 1881. It will be noticed that the trade short of tide-water is increasing very largely. This year, they will have the additional outlet eastward afforded by the 'Erie' Railway to Newburgh, and thence via the New York and New England Railroad. A railway along the line of the canal from Honesdale to Rondout, 108 miles, and down grade, would give this company, an advantageous position for commanding the trade at tide-water.

## THE DELAWARE, LACKAWANNA AND WESTERN R. R. CO.

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1871.....	1,916,486	1877.....	2,089,523
1872.....	2,836,948	1878.....	2,180,672
1873.....	3,136,306	1879.....	3,867,407
1874.....	2,570,437	1880.....	3,550,348
1875.....	3,326,901	1881.....	4,388,969
1876.....	2,300,500		

This tonnage includes coal carried, purchased and mined. There are no details of the distribution other than 'North' and 'South.' The tonnage forwarded North includes all the coal sent West, and amounted to 1,885,350 tons in 1881; the tonnage forwarded South is the coal brought to Hoboken, and for the line trade in New Jersey, and amounted to 2,486,603 tons in 1881. The extension from Binghamton to Buffalo, known as the New York, Lackawanna and Western, will prove of great advantage to this company in developing the trade in Anthracite at the West. Their facilities for receiving and transshipping at Buffalo are of great magnitude, and no doubt the tonnage in that direction will exceed the quantity forwarded in an easterly direction.

## PENNSYLVANIA RAILROAD—BELVIDERE DIVISION.

This line forms an important feeder to the Anthracite coal carrying roads centering at Phillipsburg, N. J. The sources of supply, and the distribution of tonnage, is shown below:—

From Lehigh region.....	In 1880—959,603 tons.	In 1881—1,354,435 tons.
From Wyoming region.....	In 1880—222,678 tons.	In 1881— 271,447 tons.
	<i>Tons 1880.</i>	<i>Tons 1881.</i>
Distributed to Trenton for shipment.....	52,167	84,389
Distributed to South Amboy for shipment.....	508,438	693,550
Distribution to local points for consumption.....	515,610	732,082
Coal for company's use.....	106,062	115,850

## FLUCTUATIONS IN PRICES OF ANTHRACITE.

The following are said to represent the highest and lowest prices, during the years named, for Anthracite, by the cargo, at New York City.

L.	H.	L.	H.	L.	H.
1860.....\$5 50	\$6 00	1868.....\$6 50	\$11 50	1875.....\$4 40	\$5 55
1861..... 4 20	6 00	1869..... 6 50	10 50	1876..... 3 75	5 55
1862..... 4 25	8 50	1870..... 4 50	8 50	1877..... 3 25	3 75
1863..... 7 00	11 00	1871..... 5 00	13 00	1878..... 2 75	4 50
1864..... 9 00	15 00	1872..... 3 75	6 25	1879..... 2 15	3 25
1865..... 8 50	13 50	1873..... 5 00	6 50	1880..... 3 50	4 45
1866..... 8 50	13 00	1874..... 4 55	5 55	1881..... 4 00	4 65
1867..... 6 50	8 50				

## MINERAL RAILROAD AND MINING COMPANY.

The production of Anthracite coal at the mines of this company during the year 1881, is given below ; these collieries are in the Shamokin region, and the Pennsylvania Railroad Company is the land owner.

Cameron, 164,374 tons ; Luke Fidler, 134,366 tons ; Pennsylvania, 114,733 tons.

## SUMMIT BRANCH RAILROAD COMPANY.

The production of Anthracite coal at the mines of this company in 1881 was 252,084 tons from the Summit Branch colliery, and 168,246 tons from the Short Mountain colliery. The Pennsylvania Railroad Company controls this company.

THE PRODUCTION OF ANTHRACITE, LIVES LOST, &c.

The report of the Inspectors of Mines, for 1880, gives the following statistics :—

	<i>Tons mined.</i>	<i>Employees.</i>	<i>Fatalities.</i>	<i>Average Days Work.</i>
I.....	1,461,070	6,933	15	151½
II.....	3,753,986	11,471	39	175½
III.....	3,461,372	11,616	34	174½
IV.....	5,708,813	15,987	51	187 4-10
V.....	6,293,457	17,131	37	195½
VI.....	3,980,337	10,255	26	183
Total.....	24,658,735	73,373	202	

I.—First, or Pottsville district. II.—Second, or Shenandoah district. III.—Third, or Shamokin district. IV.—Wilkes-Barre district. V.—Eastern district of Luzerne and Lackawanna counties. VI.—South district of Luzerne and Carbon counties. The tonnage mined (reported above), includes coal used about mines, and sold to employees. It averages seven to eight per cent. of the quantity marketed. The number mentioned as employed includes miners, laborers, and men and boys, inside and outside. The figures as the average number of days worked in each district are from the official figures. In the usual course of events the best collieries work the greatest number of days and the smaller ones lay idle, and it is these that reduce the average.

SCHUYLKILL LUMP COAL AT PHILADELPHIA.

Average prices per 2,240 lbs. during the years named :—

1872.....	\$3 74	1875.....	\$4 39	1878.....	\$3 25
1873.....	4 27	1876.....	3 87	1879.....	2 70
1874.....	4 55	1877.....	2 59	1880.....	4 53
1881.....					4 50

LEHIGH LUMP AT ELIZABETHPORT, N. J.

Average prices per 2,240 lbs. during the years named :—

1872.....	\$3 82	1875.....	\$5 03	1878.....	\$3 50
1873.....	4 71	1876.....	4 71	1879.....	3 29
1874.....	5 05	1877.....	3 60	1880.....	4 63
1881.....					5 10

ERIE RAILWAY—ANTHRACITE TONNAGE.

The tonnage reported below represents the production of mines in which the New York, Lake Erie and Western Railway is interested.

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1871.....	55,596	1876.....	230,709
1872.....	83,288	1877.....	175,095
1873.....	36,728	1878.....	278,132
1874.....	197,562	1889.....	437,509
1875.....	303,039	1880.....	411,094
1881.....			465,230



## THE PHILADELPHIA AND READING RAILROAD COMPANY.

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1860.....	1,946,195	1871.....	6,062,573
1861.....	1,639,535	1872.....	6,185,434
1862.....	2,310,990	1873.....	6,546,555
1863.....	3,065,261	1874.....	6,348,812
1864.....	3,065,577	1875.....	5,505,455
1865.....	3,090,814	1876.....	5,595,207
1866.....	3,714,684	1877.....	7, 55,818
1867.....	3,446,826	1878.....	5,909,140
1868.....	4,574,874	1879.....	8,147,579
1869.....	4,239,457	1880.....	7,179,398
1870.....	4,633,504	1881.....	8,072,440

The above is the total coal tonnage carried, and below will be found the distribution of the quantity so carried, during the fiscal year ending in 1881:—

Passing over Main Line and Lebanon Valley Branch.....	4,829,563 tons.
For shipment by Schuylkill Canal.....	595,504 tons.
Shipped West'd via Cat. and Wpt. Br. and N. C. Railroad.....	467,863 tons.
Shipped East via Lehigh Valley Railroad.....	66,960 tons.
Shipped West and South from Pine Grove.....	129,443 tons.
Consumed on Laterals.....	170,386 tons.
Lehigh and Wyoming coal.....	976,964 tons.
Bituminous.....	331,376 tons.
Coal for Company's use ..	554,358 tons.

Of the coal produced from the lands owned by the company during the years 1873-81, together with the reported average cost of coal in cars at the mines, the following schedule is given:—

	<i>Leases. produced.</i>	<i>P. &amp; R. C. &amp; I. Co. produced.</i>	<i>Average cost at mines.</i>
1873.....	2,055,565 tons.	1,348,838 tons.	\$2.51 per ton.
1874.....	1,802,370 tons.	1,374,790 tons.	2.45 per ton.
1875.....	1,594,741 tons.	1,510,572 tons.	1.87 per ton.
1876.....	1,218,533 tons.	1,853,364 tons.	1.35 per ton.
1877.....	1,389,103 tons.	3,794,528 tons.	1.04 per ton.
1878.....	1,100,181 tons.	2,727,608 tons.	1.24 per ton.
1879.....	1,300,322 tons.	4,269,929 tons.	1.14 per ton.
1880.....	1,235,642 tons.	3,460,464 tons.	1.43 per ton.
1881.....	1,484,992 tons.	3,937,607 tons.	1.49 per ton.

Philadelphia takes over a million tons of Schuylkill coal, carried by this company; there is a shipping business of two million tons at Port Richmond, and the 'line' deliveries aggregate nearly two millions of tons. This company also sends coal through to the tide-water shipping ports of South Amboy and Elizabethport, N. J. The coal tonnage originating at collieries tributary to this railroad company, is stated to have been 6,940,383 tons during the calendar year 1881, thus making it the largest Anthracite coal carrier.

The ton named is of 2,240 lbs., and the year in all tabular statements ends with November 30th.

## COLLIERIES IN THE SOUTHERN COAL FIELD OR SCHUYLKILL REGION.

### LYKENS VALLEY DISTRICT.

Brookside.....	Phila. & Reading C. & I. Co.	Williamstown.....	Summit Branch Railroad Co.
Kalmia.....	Phillips & Sheaffer.	Short Mountain.....	Lykens Valley Coal Co.
Lincoln.....	Levi Miller & Co.		

The above ship coal via Philadelphia and Reading Railroad, with the exception of the Williamstown and Short Mountain collieries.

### LORBERRY DISTRICT.

West End .....	Phila. & Reading C. & I. Co.	Middle Creek Shaft....	Phila. & Reading C. & I. Co.
Colket.....	Phila. & Reading C. & I. Co.	Rausch Creek.....	Miller, Greaff & Co.
East Franklin.....	Phila. & Reading C. & I. Co.		

The above ship coal via Philadelphia and Reading Railroad.

### EAST AND WEST SCHUYLLILL DISTRICT.

Black Heath.....	Wm. H. Harris.	Black Mine.....	J. D. K. Crook.
Peach Mountain.....	Wm. H. Harris.	Wood.....	C. Wood.
Wolf Creek Diamond.....	Edwin Thomas.	Glendower.....	Phila. & Reading C. & I. Co.
Wolf Creek Big Diamond.....	James F. Donohue.	Mine Hill Gap.....	Phila. & Reading C. & I. Co.
Ellsworth.....	John R. Davis.	Otto.....	Phila. & Reading C. & I. Co.
Black Valley.....	Edward Hoskins.	Phoenix Lark, 2-3.....	Phila. & Reading C. & I. Co.
Dandas No. 7.....	Davis & Co.	Forestville.....	Phila. & Reading C. & I. Co.
Monitor.....	John Denning.	Richardson.....	Phila. & Reading C. & I. Co.
Peach Orchard.....	Samuel Brown	Swatara.....	Phila. & Reading C. & I. Co.
Beechwood.....	Phila. & Reading C. & I. Co.	Thomaston.....	Phila. & Reading C. & I. Co.
W. desville Shaft.....	Phila. & Reading C. & I. Co.	East Franklin.....	Phila. & Reading C. & I. Co.
Pottsville Shaft.....	Phila. & Reading C. & I. Co.	Pine Knot.....	Phila. & Reading C. & I. Co.
Pine Forest.....	Phila. & Reading C. & I. Co.	Crystal.....	Joseph Brady.
Eagle Hill Shaft.....	Phila. & Reading C. & I. Co.	Mammoth.....	Mahoney & Co.
Line Dale.....	Louis Lorenz.	Repplier.....	J. F. Quinn & Co.
Eagle.....	G. W. Johns & Bro.	Bonanza.....	T. Ferrebe & Co.
St. Clair.....	Jos. Atkinson	Daniel Vein.....	Thomas Hellman.
Palmer Vein.....	Alliance Coal Mining Co.	Vipond.....	Thomas Burke.
Kaska William.....	Alliance Coal Mining Co.	Coal Hill.....	Holahan & Basler.
West Summit.....	A. Raabe.	East Lehigh.....	Mitchell & Simons.
West Lehigh .....	Wood & Pierce.		

The above ship coal via Philadelphia and Reading Railroad.

### SHAMOKIN DISTRICT.

North Franklin No. 1..	Phila. & Reading C. & I. Co.	*Royal Oak...	Tillet & Bro.
North Franklin No. 2..	Phila. & Reading C. & I. Co.	Peerless.....	Cruikshank & Co.
Bear Valley.....	Phila. & Reading C. & I. Co.	Henry Clay*	J. Langdon & Co.
George Fales.....	Phila. & Reading C. & I. Co.	Sterling.....	Kendrick & Co.
Burnside.....	Phila. & Reading C. & I. Co.	Buck Ridge.....	May, Audenried & Co.
*Cameron.....	Mineral Railroad and Mining Co.	Big Mountain.....	Patterson & Llewellyn.
*Luke Fidler.....	Mineral Railroad and Mining Co.	Carson.....	M. E. Robinson.
*Hickory Ridge.....	Mineral Railroad and Mining Co.	Greenback.....	H. J. Toudy.
*Pennsylvania.....	Mineral Railroad and Mining Co.	Excelsior.....	Excelsior Coal Mining Co.
*Lancaster.....	Mineral Railroad and Mining Co.	Enterprise.....	Enterprise Coal Co.

\*These ship by Northern Central, all others by Philadelphia and Reading.

## WEST MAHANOH DISTRICT.

Mt. Carmel Shaft.....	Phila. & Reading C. & I. Co.	Franklin.....	S. S. Bickel.
Locust Spring.....	Phila. & Reading C. & I. Co.	Locust Gap.....	Greaber & Shupp.
Reliance.....	Phila. & Reading C. & I. Co.	Monitor.....	Geo. W. Johns & Bro.
Bast.....	Phila. & Reading C. & I. Co.	Big Mine Run.....	J. Taylor & Co.
Helfenstein.....	Phila. & Reading C. & I. Co.	Cuyler.....	S. M. Heaton & Co.
Preston, Nos. 2 & 3.....	Phila. & Reading C. & I. Co.	Wm. Penn.....	Wm. Penn Coal Co.
Tunnel.....	Phila. & Reading C. & I. Co.	Oakdale.....	E. L. Powell.
Girard.....	Phila. & Reading C. & I. Co.	Kohinoor.....	R. Hecksher & Co.
Hammond.....	Phila. & Reading C. & I. Co.	Keeley Run.....	Thomas Coal Co.
Connor.....	Phila. & Reading C. & I. Co.	Cambridge.....	Cambridge Coal Co.
Girard Mammoth.....	Phila. & Reading C. & I. Co.	East Bear Ridge.....	Myers, McCreary & Co.
Turkey Run.....	Phila. & Reading C. & I. Co.	West Bear Ridge.....	Myers, McCreary & Co.
West Shenandoah.....	Phila. & Reading C. & I. Co.	Stanton.....	Miller, Hoch & Co.
Hank Ridge.....	Phila. & Reading C. & I. Co.	Draper.....	John Milnes.
Indian Ridge.....	Phila. & Reading C. & I. Co.	Laurel Ridge.....	John A. Dutter.
Shenandoah City.....	Phila. & Reading C. & I. Co.	Lawrence.....	Jacob S. Lawrence.
Furnace.....	Phila. & Reading C. & I. Co.	*Black Diamond.....	W. A. Schwenk & Co.
Gilberton.....	Phila. & Reading C. & I. Co.	*Morris Ridge.....	Isaac May & Co.
Boston Run.....	Phila. & Reading C. & I. Co.	*Logan.....	L. A. Riley & Co.
Bear Run.....	Phila. & Reading C. & I. Co.	*Centralia.....	L. A. Riley & Co.
Keystone.....	Phila. & Reading C. & I. Co.	*Continental.....	Lehigh Valley Coal Co.
Locust Run.....	Phila. & Reading C. & I. Co.	*Packer Nos. 1, 2, 3 & 4.....	Lehigh Valley Coal Co.
Merriam.....	Phila. & Reading C. & I. Co.	*Monroe.....	Montana Coal Co.
Potts.....	Phila. & Reading C. & I. Co.	†Mt. Carmel.....	Montelius, Robins & Co.
North Ashland.....	Phila. & Reading C. & I. Co.	†Hazel Dell.....	Luke & Jones.
Ben Franklin.....	Douty & Baumgardner.		

\*Ship via Lehigh Valley Railroad.

†Ship either via Philadelphia and Reading, Lehigh Valley or Northern Central roads.

†Ship either via Lehigh Valley or Philadelphia and Reading roads.

All others in this district by Philadelphia and Reading road.

## EAST MAHANOH DISTRICT.

Ellengowan.....	Phila. & Reading C. & I. Co.	North Star.....	Reynolds, Roberts & Co.
Knickerbocker.....	Phila. & Reading C. & I. Co.	Webster.....	L. S. Baldwin.
St. Nicholas.....	Phila. & Reading C. & I. Co.	Coal Run.....	Suffolk Coal Co.
Tunnel Ridge.....	Phila. & Reading C. & I. Co.	*Glendon.....	J. C. Haydon & Co.
Elmwood.....	Phila. & Reading C. & I. Co.	*Coplay.....	L. F. Lentz.
Mahanoy City.....	Phila. & Reading C. & I. Co.	*Primrose.....	Primrose Coal Co.
North Mahanoy.....	Phila. & Reading C. & I. Co.	*West Lehigh.....	Fisher Hazard.
Schuylkill.....	Phila. & Reading C. & I. Co.	*Middle Lehigh.....	Middle Lehigh Coal Co.
Staffordshire.....	Jones, Ward & Co.		

\*These ship via Lehigh Valley road.

All others via Philadelphia and Reading road.

## PANTHER CREEK DISTRICT.

Collieries 3.....	Lehigh Coal and Navigation Co.	Collieries 8.....	Lehigh Coal and Navigation Co.
4.....	Lehigh Coal and Navigation Co.	9.....	Lehigh Coal and Navigation Co.
5.....	Lehigh Coal and Navigation Co.	10.....	Lehigh Coal and Navigation Co.
6.....	Lehigh Coal and Navigation Co.	11.....	Lehigh Coal and Navigation Co.

COLLIERIES IN THE MIDDLE COAL FIELD OR LEHIGH REGION.

GREEN MOUNTAIN BASIN.

Upper Lehigh Nos. 2 & 5... Upper Lehigh Coal Co. | Pond Creek..... Pond Creek Coal Co.  
Ship via L. & S. Railroad.

BLACK CREEK BASIN.

Sandy Run.....M. S. Kemmerer & Co.	Jeddo No. 3 & 4.....G. B. Markle & Co.
Cross Creek Nos. 1, 2 & 3.....Coxe Bros. & Co.	Ebervale No. 2 & 3.....Ebervale Coal Co.
Middle Cross Creek.....Coxe Bros. & Co.	Latimer No. 1 & 2.....Pardee Bro. & Co.
Lower Cross Creek.....Coxe Bros. & Co.	Black Ridge.....Black Ridge Coal Co.
West Cross Creek.....Coxe Bros. & Co.	Harleigh.....McNair & Co.
Council Ridge No. 2.....J. Leisenring & Co.	Milnesville No. 6 & 7.....Stout Coal Co.
Council Ridge No. 5.....J. Leisenring & Co.	Hollywood.....Calvin Pardee & Co.
Highland No. 1 & 2.....G. B. Markle & Co.	

Sandy Run ships via L. & S. road. Cross Creek either via L. & S., L. V. or Pennsylvania Railroad. Others via Lehigh Valley road.

HAZLETON BASIN.

East Sugar Loaf, 1-2-3-5.....Liuderman, Skeer & Co.	Cranberry.....A. Pardee & Co.
Humboldt.....Liuderman, Skeer & Co.	Crystal Ridge.....A. Pardee & Co.
South Sugar Loaf.....A. Pardee & Co.	Hazleton, 1-3-6.....A. Pardee & Co.
Laurel Hill.....A. Pardee & Co.	Mt. Pleasant.....Pardee Sons & Co.
Sugar Loaf.....A. Pardee & Co.	Buck Mountain.....Buck Mountain Coal Co.

Ship via Lehigh Valley road.

BEAVER MEADOW BASIN.

Coleraine, 1-2.....W. T. Carter & Co.	Spring Brook, 5-6.....G. H. Myers & Co.
Spring Mountain, 1-4-5.....J. C. Haydon & Co.	Honey Brook, 1-2-4-5.....Lehigh & Wilkes-Barre C Co.
Beaver Brook, 1-2.....Chas. Dodson & Co.	

All ship via Lehigh Valley except Honey Brook, that via L. & S. road.

COLLIERIES IN THE NORTHERN COAL FIELD OR WYOMING REGION.

PLYMOUTH DISTRICT.

Salem.....Salem Coal Co.	Mill Hollow.....Waddell & Walter.
Colliery No. 3.....Susquehanna Coal Co.	Ellenwood.....Albright Coal Co.
Avondale.....Del. Lack. & Western Railroad Co.	Forty Fort.....J. H. Swoyer.
Boston.....Del. Lack. & Western Railroad Co.	*Gaylord.....Gaylord Coal Co.
Chauncey.....T. P. McFarlane.	*Dodson.....Plymouth Coal Co.
Kingston, 1-2.....Kingston Coal Co.	*Lance.....L. & W. B. C. Co.
East Boston.....W. G. Payne & Co.	*Nottingham.....L. & W. B. C. Co.
Black Diamond.....Haddock & Co.	*Plymouth, 2-3-4-5.....Delaware & Hudson Canal Co.
Maltby.....S. C. Maltby.	

\*Ship via L. & S. road, others via L. & B. division of D. L. & W. R. R.

WILKES-BARRE DISTRICT.

Coalmont.....Lehigh—Luzerne Coal Co.	Warrior Run.....A. J. Davis.
4 Collieries.....Susquehanna Coal Co.	Franklin.....Franklin Coal Co.
6 Collieries.....Delaware and Hudson Canal Co.	Enterprise.....Andrew Langdon.
12 Collieries.....Lehigh and Wilkes-Barre Coal Co.	Wyoming.....J. H. Swoyer.
Hillman.....H. B. Hillman.	Hollenback.....R. S. Poole & Co.
5 Collieries.....Lehigh Valley Coal Co.	Whippoorwill.....Red Ash Coal Co.

First, ships via L. & B. division of D. L. & W. Second to fourth, via L. & S. road. The others via Lehigh Valley.



## PITTSSTON DISTRICT.

3 Collieries.....	Lehigh Valley Coal Co.	Butler Shaft.....	Butler Colliery Co.
Tompkins Shaft.....	G. R. Wilson & Co.	Hil side.....	Hilside C. & I. Co.
Eagle.....	R. S. Poole & Co.	Baver.....	Waterman & Co.
3 Collieries.....	Pittston Coal Co.	Phoenix.....	Phoenix Coal Co.
7 Collieries.....	Pennsylvania Coal Co.	Columbia.....	Grove Bros.
Everhart.....	Everhart Coal Co.	Fairmount.....	A. Morris & Co.

First to fourth, ship via L. V. road. Pennsylvania goes by the company's gravity road to Hawley, etc. Everhart & Butler via L. & S. Hillside via P. & N. Y. Others via L. & B. division of D. L. & W. R. R. Co.

## SCRANTON DISTRICT.

16 Collieries.....	D. L. & W. R. Co.	Stetler.....	W. N. Stetler
3 Collieries.....	L. & S. C. & I. Co.	Fairlawn.....	Fairlawn Coal Co.
2 Collieries.....	Wm. Connell & Co.	Jermyn Shaft.....	Delaware and Hudson Canal Co.
Park.....	Bridge Coal Co.	Green Ridge.....	O. S. Johnson & Co.
Mt. Pleasant.....	W. T. Smith.	Elk Hill.....	Elk Hill Coal Co.
Pancoast.....	Pancoast Coal Co.	3 Collieries.....	Delaware and Hudson Canal Co.
2 Collieries.....	Lacka. I. & C. Co.	3 Collieries.....	Pennsylvania Coal Co.
Lucas.....	S. Lucas & Co.		

D. L. & W. carries coal from all collieries named, down to Fairlawn; the D. & H. Co. the others, excepting the Pennsylvania Coal Co's.

## CARBONDALE DISTRICT.

9 Collieries.....	Delaware and Hudson Canal Co.	Elk Creek.....	Thos. Brennan.
3 Collieries.....	Hillside C. & I. Co.	Nealon.....	Horan & Healey.
Eaton.....	Jones, Simpson & Co.	Filer Nos. 1 & 2.....	Filer & Livey.
Chestnut Hill.....	E. E. Hendricks & Co.	Winton.....	Pierce Coal Co.
Throop Shaft.....	John Jermyn.		

Filer and Winton is shipped via Delaware, Lackawanna and Western and the others via Delaware and Hudson Canal Company's road.

In order to systematically attend to the matter of proper ventilation, etc., the mines are divided into six inspection districts, as named below :

FIRST.—Pottsville district, embracing collieries the production of which is known in market as Schuylkill and Lorberrry coal. Mr. Samuel Gay, Mine Inspector.

SECOND.—Shenandoah district, embracing collieries in the Shenandoah and East Mahanoy regions, of the Schuylkill coal field. Mr. Robert Mauchline, Mine Inspector.

THIRD.—Shamokin district, embracing those collieries located in the western part of Schuylkill, eastern Northumberland and Dauphin counties. Coal sold as Lykens Valley, Shamokin and Mahanoy. Mr. James Ryan, Mine Inspector.

FOURTH.—Wilkes-Barre district, includes the collieries in the northern coal field in the middle district of Luzerne county. Mr. G. M. Williams, Mine Inspector.

FIFTH.—Scranton district, includes those collieries in the Lackawanna, Scranton and Pittston regions, located in eastern Luzerne, and in Lackawanna county. Mr. P. Blewitt, Mine Inspector.

SIXTH.—Lehigh district, includes collieries in Carbon, and in the southern part of Luzerne counties. Mr. G. Roderick, Mine Inspector.

## BITUMINOUS COAL IN PENNSYLVANIA.

There are twenty-seven counties in Pennsylvania in which Bituminous coal is produced, and our estimate of the coal mined during the year 1881, is twenty million tons, based on official figures that have come to hand and very careful estimates.

Mr. H. M. Chance, assistant State geologist has devoted much time and attention to the question of the possible supply, and he estimates that there are 33,547,200,000 tons of coal available, divided thus:—

From beds over 6 feet thick.....	10,957,200,000 tons.
From beds from 3 to 6 feet thick.....	19,586,800,000 tons.
From beds from 2 to 3 feet thick .....	3,003,200,000 tons.

Of this vast quantity, probably two-thirds lie above water-level, and can be mined and placed on the cars at an average cost not exceeding one dollar per ton.

In order to systematically attend to the matter of proper ventilation, etc., the State is divided into four districts, and the inspectors of mines hold office for four years, the present incumbents holding commissions dating from May 15, 1881, and their several districts are as follows:—

FIRST DISTRICT.—William Wilcox, for the counties of Greene, Washington, Fayette, Somerset, Bedford and that portion of Allegheny lying south of the Ohio, Monongahela and Youghiogheny rivers.

SECOND DISTRICT.—John J. Davis, for the counties of Beaver, Butler, Armstrong, Indiana, Westmoreland and that portion of Allegheny lying north of the Ohio, Monongahela and Youghiogheny rivers.

THIRD DISTRICT.—Thomas K. Adams, for the counties of Lawrence, Mercer, Crawford, Erie, Warren, Forest, Venango, Clarion, Jefferson, Clearfield, Cameron, Elk and McKean.

FOURTH DISTRICT.—Roger Hampson, for the counties of Cambria, Blair, Huntingdon, Centre, Clinton, Lycoming, Sullivan, Potter, Tioga and Bradford.

We now proceed to give the list of mines and operators, dividing them into the district, and by counties in each district, in order to make the list more valuable for reference.

## LIST OF MINES AND OPERATORS IN THE FIRST DISTRICT.

## BEDFORD COUNTY.

Lane Nos. 1 & 2.....	Sandy Run Coal Co.	Defiance.....	A. Covalt & Co.
Mt. Fquity, Nos. 1 & 2.....	Kembie Coal & Iron Co.	Rommell.....	R. Maher.
Cunard.....	R. B. Wigton.		

## SOMERSET COUNTY.

Cumberland & Elk Lick.....	Shaw, Chamberlain & Co.	Salisbury Central.....	Balt. & Cumb. Coal Co.
Cumberland.....	Thos. Williams.	Hoffman.....	Hoffman & Co.
Keystone.....	Keystone Coal Co.	.....	Samuel Adams.
Hersh.....	J. K. Hoblitzell.	Philson Iron Coal Co. ....	S. Philson & Sons.
Salisbury.....	Thos. Williams.	Berlin.....	R. D. Morgan & Co.
.....	James Cochran.	Buffalo Creek.....	Swede I. & C. Co.
Tub Run.....	W. J. Smith & Co.	Myersdale.....	Myersdale Coal Co.

## WASHINGTON COUNTY.

Keystone Mines.....	Keystone Coal Co.	Walnut Hill No. 2.....	T. B. Robbins & Co.
Frier Hill.....	J. D. Sanders.	Block Mine.....	G. W. Crawford.
Primros.....	T. B. Robbins & Co.	Cliff Mine.....	Scully & Co.

Coal Bluff.....Patterson & Co.  
 Buffalo.....Chicago Gas Coal Co.  
 Byers.....J. Loutitt & Co.  
 Banner Works.....Gamble & Risher.  
 Cincinnati.....J. S. Peel.  
 Huston.....J. B. Huston.  
 New Eagle.....Lindsay & Cutcheon.  
 Catsburg.....Harlem Coal Co.  
 Warne.....Hiram Warne.  
 Black Diamond.....Harlem Coal Co.  
 Hays' Mine.....A. Hays & Co.  
 Buzzard.....Harlem Coal Co.  
 American.....F. H. Corson.

Woods' Run.....Thos. J. Woods.  
 Champion.....Morgan & Dixon.  
 Caledonia.....Caledonia Coal Co.  
 Smith Mine.....J. S. Noel.  
 Dexter.....Crowthers & Musgrave.  
 Globe.....Crowthers & Musgrave.  
 Knob Colliery.....Knob Coal Co.  
 Clipper.....E. Forlong.  
 Stockdale.....Elizabeth Coal Co.  
 Shireoaks.....Blackburn & Mort.  
 Union Valley.....Jacob Leglor.  
 Courtney.....Berry, Cock & Co.

## ALLEGHENY COUNTY.

Imperial (two mines).....Imperial Coal Co.  
 Glendale.....S. B. Gregg.  
 Nixon.....Chartiers Valley Coal Co.  
 Black Diamond.....W. Bains & Bro.  
 Summer Hill.....Frank Armstrong.  
 Bower Hill.....A. J. Shultz.  
 Clark Slope.....James Clark.  
 Allison Mine.....J. Allison.  
 Enterprise.....V. Harding.  
 Sandy Creek No. 1.....N. Y. & Cleveland Gas Coal Co.  
 Sandy Creek No. 2.....N. Y. & Cleveland Gas Coal Co.  
 Union Works.....M. Graver & Co.  
 Plum Creek No. 1.....N. Y. & Cleveland Gas Coal Co.  
 Plum Creek No. 2.....N. Y. & Cleveland Gas Coal Co.  
 Three Collieries.....Gray & Bell.  
 Enterprise.....Hartley & Marshall.  
 Eclipse.....John Carlin & Co.  
 Bells Mines.....Mansfield Coal and Coke Co.  
 Grant Mine.....Grant Coal Co.  
 Camp Hill.....D. Steen & Sons.  
 Jackson Mines.....Jas. Ewing & Co.  
 Pittsburgh Union.....Jos. McConnell.  
 Fort Pitt Mines.....Fort Pitt Coal Co.  
 Cherry Mine.....Morris McCue.  
 Oak Ridge.....Oak Ridge Coal Co.  
 National.....National Coal Co.  
 Laurel Hill.....W. P. Rend & Co.  
 Willow Grove.....T. B. Robbins & Co.  
 Phoenix.....Phoenix Gas Coal Co.  
 Oak Hill No. 3.....N. Y. & Cleveland Gas Coal Co.  
 Oak Hill No. 4.....N. Y. & Cleveland Gas Coal Co.  
 Corey's.....J. B. Corey & Co.  
 Hampton Mines.....John McIntosh.  
 Fair Haven Mine.....P. & C. S. Coal Co.  
 Wood Mine.....Wettingel & Gormley.  
 Nimick Mine.....Thomas Fox.  
 Penney Mine.....Lynch & Robinson.

Youghiogheny Mines.....James O'Neil.  
 Cornell & Werlings.....W. H. Brown's heirs.  
 Keelings.....Birmingham Coal Co.  
 American Works.....Jones & Laughlin.  
 Becks Run Mine.....H. B. Hays & Bro.  
 Heberman.....Jos. Walton & Co.  
 Six Mile Ferry (2 pits.).....H. B. Hays & Bro.  
 Munhall.....H. B. Hays & Bro.  
 Streets Run.....I. D. Risher.  
 Green Springs.....Thomas Fawcett.  
 McCloskey.....W. H. Brown's heirs.  
 Keystone Nos. 1 & 2.....W. H. Brown's heirs.  
 Neels.....Wm. Neel's heirs.  
 Amity Nos. 1 & 2.....J. C. Risher & Co.  
 Camden.....Geo. Lysle & Sons.  
 Coal Valley.....W. Stone's heirs.  
 Allequippa.....O'Niell & Co.  
 Rock Run.....W. J. Snodgrass.  
 Pine Run.....Jas. Lynn & Co.  
 Jefferson.....N. C. Clark.  
 Jenkins.....Robbins & Jenkins.  
 Bellevue.....Gumbert's heirs.  
 Lovedale.....Wood, Schrader & Co.  
 Enterprise.....Hooper & Roberts.  
 Enterprise.....O'Niell & Co.  
 Lower Road.....Walton & Co.  
 Upper Road.....Walton & Co.  
 Fulton.....Jones's heirs.  
 Wenone.....Skellon & Co.  
 Osceola.....Osceola Coal Co.  
 Alpsville.....Hackett & Hafferty.  
 Duncans.....Duncan Bros.  
 Millsville.....Jos. Jenkins.  
 Rea Mine.....J. Crumie & Co.  
 Weinman.....Jacob Weinman.  
 Pine Run, No. 2.....James Lynn & Co.

## FAYETTE COUNTY.

Rutherford.....J. Rutherford.  
 .....Trumbull & Hall.

Excelsior.....C. H. Armstrong & Son.  
 Little Alps.....Little Alps Coal Co.

Cedar Hill.....	Morgan & Dixon.	Umpire.....	J. S. Cunningham & Co.
Garrows.....	Joseph Garrow.	Carondolet.....	Frazer & Frye.

Above concerns, named as in Fayette county, ship by the Monongahela; for the remainder of the operators in Fayette county, reference is invited to the list of coking coal operators on page 26. It is hardly worth while to repeat the list here.

## LIST OF MINES AND OPERATORS IN THE SECOND DISTRICT.

### ARMSTRONG COUNTY.

Stewardson.....	F. B. & A. Laughlin.	Pine Creek Furnace Mine.....	Brown & Mosgrove.
Reimerton.....	Reimerton Coal Co.	Kittaning Mine.....	Kittaning Iron Co.
Mahoning.....	Mahoning Coal Co.	New Bethlehem.....	Sandy Lick Coal Co.
Mahoning Furnace Mine.....	Wesley, Wilson & Co.	Freeport Mine.....	James O. Mealy.

### BEAVER COUNTY.

Canelton Mine.....	I. F. Mansfield.	Coburn Mine.....	Jas. H. Coburn.
Beaver Hall Mine.....	A. Davidson.	Clayton Mine.....	Jas. Clayton & Co.
Beaver Block Mine.....	J. Sutherland.	Butts Mine.....	F. Butts.
Baker Bank.....	Scott & Co.		

### BUTLER COUNTY.

Karns City Mine.....	H. R. Fullerton.	Barnes Mine.....	Mercer Mining & M. Co.
Burnett Mine.....	Burnett C. & C. Co.	Cherry Mines.....	Union Coke & Coal Co.
Acberr Slope.....	Acberr Mining Co.		

### INDIANA COUNTY.

Turner Mine.....	J. M. Turner.
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### ALLEGHENY COUNTY.

Natrona.....	Penna. Salt M'fg Co.	Etna & Vesuvius.....	P. Y. Hite.
Bellevue.....	P. Y. Hite.		

### WESTMORELAND COUNTY.

Shaft Nos. 1 & 2.....	Penn Gas Coal Co.	Rising Sun.....	C. P. Markle & Sons.
Mine No. 4.....	Penn Gas Coal Co.	Buckeye.....	John M. Cochran heirs.
Coal Run.....	Penn Gas Coal Co.	Mullen.....	W. D. Mullen.
Penn Slope.....	Penn Gas Coal Co.	Upper and Lower Slope.....	Boyle & Rafferty.
Spring Hill.....	Westmoreland Coal Co.	Markles.....	C. P. Markle & Sons.
New Larimer.....	Westmoreland Coal Co.	Union.....	Hurst, Stoner & Co.
South Side.....	Westmoreland Coal Co.	South West.....	South West Coal Co.
North Side.....	Westmoreland Coal Co.	Greensburg.....	Greensburg Coal Co.
Shafton.....	Westmoreland Coal Co.	Enterprise.....	Dillinger & Rafferty.
Foster Slope.....	Westmoreland Coal Co.	Alice Mine.....	J. W. Schoonmaker.
Westmoreland Shaft.....	Westmoreland Coal Co.	Armstrong.....	C. H. Armstrong & Co.
Latrobe.....	M. Saxman, Jr. & Co.	Ocean.....	W. L. Scott & Co.
Loyal Hanna.....	Loyal Hanna Coal Co.	Black Ball.....	N. J. Bigley.
Millwood Shaft.....	Millwood Coal Co.	Markle.....	C. P. Markle & Sons.
Monastery.....	Edgar Thompson Steel Co.	West Newton.....	West Newton C. Co.
Greensburg.....	Coulter & Huff	Guffy's.....	Grand Lake C. Co.
Leechburg.....	David B. Ashbaugh.	White Heath.....	R. B. Latimore.
Mill Bank.....	Laufman & Co.	Waverly.....	Waverly Coal and Coke Co.
Saltsburg.....	Saltsburg Coal Co.	Eureka.....	Fox, Kiffer & Co.
Cokeville.....	Isabella Furnace Co.	Osceola.....	Osceola Coal Co.
Overton.....	A. C. Overholt & Co.	Yough Valley.....	John Blythe & Co.



## LIST OF MINES AND OPERATORS IN THE THIRD DISTRICT.

## McKEAN COUNTY.

Clermont.....	Buffalo Coal Co.	Butt-ville.....	J. E. Putts, Jr.
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## ELK COUNTY.

St. Marys.....	St. Marys Coal Co.	Eureka .....	D. Eldridge.
Glen Mayo.....	Jas. H. Mayo & Co.	Cascade.....	Kaul & Hall.
Dagus Mines.....	Northwestern M. & E. Co.		

## CAMERON COUNTY.

Cameron.....	Cameron Coal Co.
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## \*CLEARFIELD COUNTY.

Sandy Lick.....	Sandy Lick Coal Co.	Clearfield.....	Clearfield Coal Co.
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## JEFFERSON COUNTY.

Pancoast.....	Heim, Goodwill & Williams.	Hamilton .....	Ham'ltan Coal Co.
Washington.....	Frank Williams.	Soldier Run.....	Powers, Brown & Co.
Diamond.....	Diamond Coal Co.		

## CLARION COUNTY.

Red Bank Furnace Mine.....	Reynolds & Co.	Pine Run Mine.....	Pine Run C. & M. Co.
Mineral Ridge.....	Mineral Ridge Coal Co.	Hardscrabble.....	Brady's Bend Coal Co.
Sligo Branch.....	Sligo Branch Coal Co.	Monterey.....	Church Hill Coal Co.
Fairmount (4 pits).....	Fairmount C. & I. Co.	Clarion.....	Clarion Coal Co.
Catfish (3 pits).....	Pittsburgh C. & M. Co.		

## VENANGO COUNTY.

Maple Grove.....	S. P. McCalmont.	McElhinney.....	Tiel & McDowell.
Cranberry.....	Cranberry Coal Co.	Philadelphia.....	James Kennedy.

## MERCER COUNTY.

Oakland Shaft.....	Oakland Coal Co.	Carbon Run Mine.....	Carbon Coal Co.
Home Bank.....	Buhl, Westerman & Co.	Wise Shaft.....	Snyder Coal Co.
Hickory Mine.....	Spearman & Co.	Rankin Mine.....	John F. Filer & Co.
Pacific Slope.....	Dunham, Roberts & Co.	Joy Hill Mine.....	Kettering & Dunham.
Bethel Shaft.....	Curtis & Boyce Coal Co.	Hoffman Slope.....	Hoffman & Co.
Pardoe Mine.....	Mercer M. & W. Co.	Duncan Shaft.....	Duncan Coal Co.
Jackson Mine.....	Jackson Coal Co.	Orangeville Shaft.....	Morris Coal Co.
Stoneboro Mine.....	Mercer Iron & Coal Co.	Neshannock Shaft.....	J. Phillips & Co.
Wheeler Shaft.....	Wheeler Iron Co.	Fgbert & Oak Hill.....	Filer & Co.
Laird Mine.....	Thomas Laird.	Lackawannock.....	Pierce Coal Co.

## LAWRENCE COUNTY.

Beaver.....	Iee & Patterson.	Wallace .....	Sharpless & Kincaid.
Clinton.....	Clinton Coal Co.	Shoaff.....	Bay, Shoaff, Spears & Co.
Davidson.....	W. B. Enos & Co.	Coal Center .....	Neshannock Coal Co.
Welsh.....	Wampum Furnace Co.	Edenburg.....	Edenburg Coal Co.

\*These mines are on the low grade division of the Allegheny Railroad. The mines of the Clearfield region are tabulated at page 24.

LIST OF MINES AND OPERATORS IN THE FOURTH DISTRICT.

BRADFORD COUNTY.

Barclay.....	Towanda Coal Co.	Long Vall y.....	J. Macfarlane.
Carbon R'n. ....	Schraeder Coal Co.		

TIOGA COUNTY.

Morris Run.....	Morris Run Coal Mining Co.	Fall Brook.....	Fall Brook Coal Co.
Arnot.....	Blossburg Coal Co.	Antrim.....	Fall Brook Coal Co.

LYCOMING COUNTY

McIntyre.....	McIntyre Coal Co.
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CENTRE COUNTY.

Snow Shoe.....	Berwind, White & Co.	Black Diamond.....	W. J. Jackson.
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HUNTINGDON COUNTY.

Powelton.....	E. H. Powel & Co.	Carbon.....	Mears Brothers.
Vooredale.....	Reakirt Bros. & Co.	Robertsdale.....	Rockhill Iron & C. Co.
Howe—Fisher.....	W. H. Sweet & Co.		

BLAIR COUNTY.

Bennington Shaft.....	Blair Iron & C. Co.	Horse Shoe.....	S. C. Baker.
Porter Shaft.....	Denniston, Porter & Co.	Glen White.....	Glen White Coal Co.

CAMBRIA COUNTY

Four Mines.....	Cambria Iron Co.	Argyle.....	Argyle C. Co.
Woodvale.....	Johnstown M'f'g Co	Stineman No. 2.....	Stineman & Co.
Lloydsville.....	Bells Gap R. R. Co.	.....	Luke & Heist,
Sonman.....	W. H. Piper.	Westbrook Shaf .....	Cambria C. & M. Co.
Benns Creek.....	S. H. Smith.	Martin.....	J. C. Martin & Co.
Lilly's.....	Dysart & Jaughlian.	Mentzer.....	E. W. Mentzer.
Old South Fork.....	South Fork C. W. Co.	.....	D. Eldridge.
Stineman.....	J. C. Stineman.		

MYERSDALE REGION.

Reference to the list of mines in Somerset County, Pa., will inform the reader as to the operators in the district or region, of which Mye sdale is the headquarters. The coal mined is of good quality as the seam worked is said to be an extension of that found in the Georges Creek Valley to the south. Business does not grow very rapidly, yet there is always an increase recorded each year. The Keystone Coal Co., last year put out 53,000 tons; the Elk Lick 65,000 tons, and the Salisbury 45,000 tons. Other smaller concerns made sufficient output to show a total of 225,000 tons for the year 1881. An analysis made by the Chemist of the Geological Survey shows, 1.665 water; 22.350 volatile matter; 68.774 fixed carbon; 1.246 sulphur; ash 5.965. Coke per cent., 75.985. Color of ash, gray, with pink tinge.

## REYNOLDSVILLE REGION.

The coal mines in this district are located along the line of what is called the low grade division of the Allegheny Valley Railroad, in Jefferson and Clearfield counties, Pennsylvania. The coal is of most excellent quality for steam generating purposes. Wherever it has had a trial the record has been of such a character as to warrant an increase in demand. The vein of coal opened is designated as the lower Freeport bed, and varies in thickness from five to eight feet, while that of the upper Freeport bed is opened in but few places near the centre of the basin, showing a thickness of about five feet. These two veins are included in the middle measures, and are above water level. The analyses made by the Survey show the coal to be of even character, and we take as an average : 32.90 volatile ; 62.194 fixed carbon ; 3.10 ash ; 1.10 moisture ; sulphur .726. The tonnage for 1881 is put at 600,000 tons, while that of 1880 was 403,419 *net* tons, as compared with 274,810 tons in 1879. All the year there was constant complaint of a short supply of cars, and this alone prevented the recording of a larger production. Coking is carried on at the Rochester and Soldier Run collieries quite successfully. The sales have been extended and Reynoldsville coke is an article of commerce in Buffalo and Chicago. The coal worked at Tyler Station, shows by analysis : Fixed carbon 61.56 ; volatile matter 31.06 ; ash, 4.95 ; sulphur 1.49 ; water 0.94. Seam is four feet in thickness, and it is said that this seam belongs to the third coal basin, and is not the same as that worked near Houtzdale.

There is no doubt but that this district would soon turn out double the quantity, if the railway facilities were at all adequate. During last year there was considerable work done on the long talked of 'Erie' outlet. When this line is completed and the district is placed in direct connection with Buffalo, its natural outlet, we may expect to see larger figures in the tonnage reports. The operators are going for better prices this year, as they have formed an association looking to this result.

## WEST BRANCH REGION.

We include in this region the several collieries located in Cameron and Elk counties, Pa., along the line of the Philadelphia and Erie Railroad. They are as below :

<i>Collieries.</i>	<i>Location.</i>	<i>Operators.</i>	<i>Tons 1880.</i>	<i>Tons 1881.</i>
St. Vary's mines,	St. Mary's,	St. Mary's Coal Co.,	85,000	85,000
Cascade mines,	St. Mary's,	Kaul & Hall,	20,000	25,000
Daguschahonda mines,	Dagus City,	Northwest'n Min. & Ex. Co.	161,885	234,358
Glen Mayo mines,	Wilmarth,	J. H. Mayo & Co.,	10,000	15,000
Eureka mines,	Kersey.	D. Eldridge,	49,500	40,000
Cameron mines,	Cameron,	Cameron Coal Co.,	40,000	40,000

Outlet to market is via Philadelphia and Erie ; and the Buffalo, New York and Philadelphia railroads.

The coal from the Northwestern M. & E. Co. goes to the 'Erie' railway for supply coal, and this accounts for the large increase in the output. Cameron did not do any more in 1881 than in preceding year. Their mines are only 125 miles from Buffalo, and some trade is done there, and last season a few cargo s were sent east from Buffalo by canal to New York. All the other concerns ship coal for sale, but the tonnage from their mines does not grow very rapidly.

## ALLEGHENY MOUNTAIN REGION.

All the collieries are located near to or upon the Pennsylvania Railroad, in Blair and Cambria counties, producing about one million tons of coal per annum. Many large consumers of coal, such as the Cambria Iron Works, are located in this district. There were carried to market by the Pennsylvania Railroad 301,707 tons coal and 99,046 tons coke, last year. The Sonman vein coal is well known and much liked, and a larger business was done last year. An analysis of this coal shows: Vol. matter, 18.30; fixed carbon, 78.60; ash, 2.70; sulphur, 0.40. Martin & Co's Tront Run mines have been largely developed in the past year, and a business opened at tide-water that will grow. We give analysis, as made by A. S. McCreath. Fixed carbon, 77.132%; volatile matter, 18.535%; moisture, .840%; sulphur, .573%; ash, 2.920%; coke, 80.625%; color of ash, cream. D. Eldridge has opened up the Sonman shaft colliery in this district and is shipping coal to tide-water.

## WESTMORELAND REGION.

This region is in Westmoreland county and is one of the most important coal districts in the State of Pennsylvania, in regard to the quality and quantity of coal produced. Westmoreland coal analysed as follows:—volatile matter, 36%; fixed carbon, 58%; ash, 6%. The celebrated Penn and Westmoreland Gas coal is mined near Penn and Irwin stations, on the Pennsylvania Railroad, in Westmoreland county; the distance from Philadelphia is 332 miles. The coal mined is the great Pittsburgh bed of Bituminous coal. The companies operating in this region are large and influential, among them being the Penn Gas Coal Company, W. L. Scott & Co., Waverly Coal and Coke Company and the Westmoreland Gas Coal Company. The coal is used in every seaboard city for gas purposes, and always commands the highest price. The shipments east are via the Baltimore and Ohio (Pittsburgh, Washington and Baltimore division,) and the Pennsylvania; to Baltimore, South Amboy and Philadelphia. The output of coal and coke in this region must be upwards of two and a half millions of tons. The Pennsylvania Railroad Company carried out from it, during 1881, 982,293 tons coal, and 205,766 tons coke. Previously thereto their shipments of coal had been as follows:—

Year.	Tons.	Year.	Tons.
1874.....	952,971	1877.....	786,039
1875.....	796,963	1878.....	692,586
1876.....	90,139	1879.....	816,302
1880.....			943,177

## SNOW SHOE REGION.

This region is located in Centre county, Pennsylvania. It covers an area of about eight miles in length, and some four miles in breadth, and is situated on both sides of Beach Creek. The coal finds an outlet to market, via the Bellefonte and Snow Shoe, and Bald Eagle Valley connections of the Pennsylvania Railroad. The distance from Snow Shoe to Tyrone, (on the main line,) is 47 miles. The colliery at Snow Shoe, and the railway, were opened up in 1862, and have been operated by the Bellefonte and



Snow Shoe Railroad Company. During January, 1881, the Pennsylvania Railroad Company secured the mines and railroad, by purchase, and a company was organized to mine coal and make coke, and the business for 1881, was 128,263 tons of coal, and 13,190 tons of coke, shipped over the Pennsylvania Railroad. Berwind, White & Co. are the tide-water representatives for this coal, and they report having made a trade by rail into New York and New England, for which this district has special geographical and railway facilities. We append details for ten years preceding.

Year.	Tons.	Year.	Tons.
1871.....	79,984	1876.....	51,399
1872.....	68,988	1877.....	42,985
1873.....	95,257	1878.....	29,168
1874.....	63,740	1879.....	56,654
1875.....	62,426	1880.....	56,020

### THE MONONGAHELA REGION.

By means of its slack-water navigation, the Monongahela river is made navigable at all seasons of the year, and boats carrying eight hundred tons are passed down. The city of Pittsburgh is supplied mainly by railroad, and the larger portion of the coal shipped by river is run down the Ohio and Mississippi to the lower markets. The following statement of shipments by the slack-water navigation, from 1860 to date, is of interest.

Year.	*Tons.	Year.	*Tons.
1860.....	1,517,909	1871.....	1,944,852
1861.....	834,630	1872.....	2,291,220
1862.....	743,358	1873.....	2,094,312
1863.....	1,134,150	1874.....	2,503,504
1864.....	1,402,828	1875.....	2,275,265
1865.....	1,580,791	1876.....	2,495,800
1866.....	1,704,212	1877.....	2,677,460
1867.....	1,202,908	1878.....	2,797,530
1868.....	1,812,040	1879.....	2,623,232
1869.....	2,100,504	1880.....	3,361,934
1870.....	2,303,856	1881.....	3,450,186

Business from this region still holds good in spite of the railway schemes that are to take away the river coal-man's prestige. With anything like a stream below Pittsburgh, water can discount the rail as a means of cheap transit for a heavy article like coal. One tow-boat takes down 5,500 tons at a trip to Louisville say 600 miles, at a cost of two cents per bushel, or 50 cents per ton, including return of empty craft. The season was rather blue from the fourth of July to the middle of November, but in November and December some big tows went out (aggregating 25,000,000 bushels) and this kept the lower markets well stocked. Wholesale rates at Pittsburgh at the opening of 1881, were only \$1.86 per 2,000 lbs., and the miners got \$1.06 per ton out of this. Competition from the Kanawha and Ohio keeps rates low at the Southern ports. The railroad shippers did a heavy business out of this district and the estimate of two millions of tons is within the mark. On the river, Pool No. 2, did the largest business. One concern, O'Niel & Co., loaded one thirtieth part of all the coal sent out by water during the year. In addition to the coal reported above, 150,000 tons of coke were sent out by river to Southern ports.

\*We have estimated 25 bushels, of 80 lbs., to the ton of 2,000 lbs.

## WEST VIRGINIA GAS COAL.

That quality of coal known in the New York and Eastern markets as "West Virginia Gas Coal" is mined in Marion, Taylor, Ritchie and Preston counties, West Virginia, the mines being located near to or upon the main line of the Baltimore and Ohio Railway. The coal is used for gas making in the cities of the seaboard, and is very favorably spoken of. The distances to Baltimore are as follows: From Clarksburg, 301 miles; from Fairmount, 302 miles; from Newburg, 263 miles; from Tunnelton, 260 miles; from Cairo, 355 miles. The veins are from six to eleven feet in thickness. Analyses of these coals have given the following results:

	<i>Volatile matter.</i>	<i>Fixed carbon.</i>	<i>Ash.</i>
Clarksburg, main seam.....	56.74	41.66	1.60
Clarksburg Cannel.....	49.21	45.43	5.36

Professor Doremus' analysis of the Montauk coal which is mined at Flemington, Taylor county, was as below:

Carbon.....	80.8200	Moisture.....	1.0500
Hydrogen.....	5.5200	Ash.....	3.8400
Oxygen and nitrogen.....	8.4706	Sulphur.....	0.2994

The business of the district is stated to be about five hundred thousand tons. In addition to the outlet eastward via Baltimore and Ohio Railroad, there is the Parkersburg route due west, crossing the Monongahela river at Clarksburg, and thence to the Ohio river at Parkersburg; and the Wheeling route north-westward, crossing the Monongahela at Fairmount, thence down the creek to the Ohio, and thence up the river to Wheeling. Both these branches enter the main coal measures near the crossing of the Monongahela above named, and traverse them to the Ohio. At Clarksburg and northward, down the Valley of the Monongahela, is one of the richest coal regions of West Virginia. One of the beds in the neighborhood of this town measures from ten to twelve feet in thickness, with a thinner bed of more highly Bituminous nature underlying; from some distance above Clarksburg, they may be followed with scarcely an interruption throughout the whole Valley of the Monongahela, northward to Pittsburgh.

We make the following estimate upon good authority of the shipments to Baltimore:

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1868.....	165,772	1875.....	177,316
1869.....	269,158	1876.....	127,293
1870.....	249,879	1877.....	103,035
1871.....	189,763	1878.....	140,000
1872.....	217,569	1879.....	165,000
1873.....	190,673	1880.....	210,000
1874.....	131,703	1881.....	300,000

There was more of this coal in market last year as the Montauk did a good business East and West, and the Monongahela Co. had part of the contract to the Philadelphia Gas Works. The two coals named, together with the Despard, Newburg Orrel, Tyrconel Fairmount, Palatine and the Consolidated Company's product, are all good coals. The Baltimore and Ohio Railroad Company is fostering the coal trade along its lines. We expect gas coals will be higher during 1882.

## BROAD TOP SEMI-BITUMINOUS COAL FIELD.

An outlet for the coal from the region is afforded by the Huntingdon and Broad Top Mountain Railroad (this was completed in 1856, and during the latter part of that year 42,000 tons were forwarded from this region to various markets.) The line extends from the town of Huntingdon, on the Pennsylvania Railroad, 203 miles west of Philadelphia, to Mt. Dallas, in Bedford county, a distance of 45 miles. At Saxton, 24 miles from Huntingdon, a branch road, 10 miles in length, extends to Broad Top City; at Riddlesburg, 5 miles beyond Saxton, is a branch into Fulton, 5 miles from the main road.

From Mt. Dallas the Bedford and Bridgeport Railroad, 386-10 miles in length, extends to the Maryland State line; from this point to Cumberland, Md., via the Cumberland and Pennsylvania Railroad is 7 miles. At or near Cumberland, connection is made with the Cumberland and Pennsylvania, and the Georges Creek and Cumberland roads. This connection gives an outlet for the Cumberland coal to the interior markets of Pennsylvania, to Philadelphia and South Amboy, N. J. The Bedford and Bridgeport road is leased to the Pennsylvania Railroad, and operated by them.

We append details of the tonnage of the Huntingdon and Broad Top road, during the past ten years.

1872.....	297,473 tons	1877.....	140,143 tons.
1873.....	350,245 tons.	1878.....	150,24 tons.
1874.....	226,693 tons.	1879.....	141,594 tons.
1875.....	204,921 tons.	1880.....	174,736 tons.
1876.....	159,779 tons.	1881.....	204,819 tons.

The shipments of Cumberland coal over the Pennsylvania and the Huntingdon and Broad Top Railroads have been as below:

1872.....	27,021 tons.	1877.....	187,458 tons.
1873.....	114,589 tons.	1878.....	163,598 tons.
1874.....	67,671 tons.	1879.....	171,930 tons.
1875.....	175,154 tons.	1880.....	242,593 tons.
1876.....	145,796 tons.	1881.....	313,000 tons.

\* The East Broad Top Railroad penetrated this coal field in 1875; there were delivered to the Pennsylvania Railroad at Mt. Union, 53,567 tons of coal during 1875, 66,104 in 1876, 54,738 in 1877, 63,068 in 1878, 67,929 in 1879, 72,450 in 1880, and 91,745 tons in 1881. In addition, some 47,634 tons were last year used in the furnaces, on the line of the E. B. T. road.

The coal measures are regular in structure, with gentle undulations dividing the field into several synclinals or basins. The coal is semi-Bituminous in its nature, and has been largely used for blacksmithing purposes, for generating steam in locomotives, marine and stationary engines, in rolling mills, puddling furnaces and forge fires; with glass works it is an especial favorite. It gives a white ash, is free burning, and easily ignited. Included in this region, are all the mines in Huntingdon and Bedford counties.

## THE CONNELLSVILLE COKE REGION.

Every operator in coal which has coking qualities, endeavors to show by analysis that it equals Connellsville. It is not so long ago that the business of coking coal began, and yet to-day land within the charmed circle of ovens is valued at from \$750 to \$3,000 per acre. At one cent per bushel royalty it is worth the larger sum. In a few years at the present rate of production—three million tons of coke, or nearly five millions of coal—there may be even greater revenue realized from this land. The Connellsville district is situated in the southwestern part of the State of Pennsylvania, lying mainly in the counties of Westmoreland and Fayette, and distant some 50 to 60 miles from Pittsburgh. The coal basin is 50 miles in length, by about three miles in width; and the coal seam is from eight to nine and a half feet in thickness. From this little strip of territory is drawn the solid carbon which feeds blast and smelting furnaces from Lake Champlain on the East to Omaha and Salt Lake on the West, and from Canada to Texas.

The coal is Bituminous, with generally a dull resinous lustre, alternating with seams of bright, shining, crystalline coal, coated with a yellowish silt. It contains numerous particles of slate, and some crystals of pyrites. It is compact, with a tendency to break up into cubes. One of the latest analyses that we have of this coal, showed—fixed carbon, 64.18; vol. matter, 28.50. ash, 6.12; sulphur, 0.6; moisture, 1.20. It yields a coke which is nearly ninety per cent. fixed carbon and less than one-half of one per cent. sulphur.

The coke from this region is of silvery lustre, cellular, with a metallic ring, tenacious, comparatively free from impurities, and capable of bearing a heavy burden in the furnace. Its porosity and ability to "stand up" in the furnace are what have given it such a reputation for a blast furnace fuel, and created such demand for it for mixing with Anthracite and Bituminous coal in the East and West, especially where an open iron, such as is used in the Bessemer process, is needed.

In 1876, there were perhaps 3,260 ovens in various stages of completion, in the district; at present there are about 8,000 in use, and there are three thousand more under construction by the various corporations. In the event of all being at work, there would then be a daily yield of 15,000 tons. There are difficulties in the way of accomplishing this total and the greatest obstacle is the lack of transportation facilities. it is a plum worth trying to pick, and new lines are trying to get into the region. Fourteen dollars a car to Pittsburgh is profitable beyond question.

In coking the coal, the beehive oven is in universal use in the Connellsville region. These ovens vary, at the different works, from 11 to 12 feet in diameter, and from 5 to 6 feet in height. The working is very simple. The coal is dumped through an opening in the crown of the furnace, and spread evenly on the floor, to the average depth of 2 feet for 48-hour coke, and  $2\frac{1}{2}$  feet for 72-hour. The front opening, through which the coke is discharged, is at first nearly closed with brick, luted with loam. The heat of the oven from the previous coking fires the charge, and as the coking progresses, the air is more and more shut off by luting the openings, and finally closing the roof openings. The average charge is 100 bushels of coal at 76 lbs., and the yield in coke, 120 bushels at 40 lbs., making the percentage yield 63, or 1.6 tons of coal to 1 ton of coke. The average time of coking is 48-hours, with 72-hours for that burned over Sunday;



24-hour coke is sometimes made The 72-hour coke is firmer coke than either of the others, but it is questionable whether it is a better furnace coke. When the coke is thoroughly burned the door is removed, and the coke is cooled by water thrown in from a hose, and then drawn.

Prices were steady during the year 1881, hardly changing from \$1.50 to \$1.65 at the ovens; there was a little spurt at the close of the year and \$1.75 @ \$2.00 was realized. As we have stated above, the output in the past year was in round figures 3,000,000 tons.

Following is a list of owners of coke ovens in the coking coal belt:

MT. PLEASANT BRANCH.		S. W. PA. R. R.	
H. C. Frick & Co.....	100	Chicago & Con. Coke Co.....	106
H. C. Frick & Co.....	106	Cleveland Coke Co.....	225
H. C. Frick & Co.....	158	A. H. Sherrick & Co.....	70
H. C. Frick & Co.....	140	Sherrick & Wiley.....	20
H. C. Frick & Co.....	84	S. W. Coal & Coke Co.....	68
H. C. Frick & Co.....	76	Hurst, Stoner & Co.....	70
H. C. Frick & Co.....	142	S. W. Coal & Coke Co.....	72
Cochran & Keister.....	50	Dillinger & Rafferty.....	50
H. C. Frick & Co.....	56	S. W. Coal & Coke Co.....	100
Cochran & Keister.....	44	Dillinger, Tar & Co.....	64
H. C. Frick & Co.....	153		
H. C. Frick & Co.....	50		845
J. R. Stauffer & Co.....	40	S. W. PA. R. R. BRANCHES.	
McClure & Co.....	258	Cambria Iron Co.....	400
Fairchance Iron Co.....	30	Connellsville Coke & Iron Co.....	200
John M. Cochran, heirs.....	120	Connellsville Gas Coal Co.....	200
B. F. Coughenour & Co.....	20	A. C. Overholt & Co.....	120
Boyle & Rafferty.....	263	J. F. Overholt.....	36
Mullen & Strickler.....	82	Markle & Co.....	86
H. C. Frick & Co.....	164	Markle & Son.....	170
Charlotte Furnace Co.....	81	J. M. Schoonmaker.....	100
J. W. Moore & Co.....	200	H. C. Frick & Co.....	300
	2,417	H. C. Frick & Co.....	100
		Fox, Keifer & Co.....	18
			1,730
FAYETTE CO. BRANCH.		PITTSBURGH DIVISION OF PA. R. R.	
Cambria Iron Co.....	500	W. H. Brown & Co.....	20
J. M. Reid.....	76	Patrick Connelly.....	24
H. C. Frick & Co.....	100	Yough Coal Hollow C. Co....	20
Youngstown Iron Co.....	100	W. L. Scott & Co.....	30
Dunbar Furnace Co.....	89	Waverly Coal & Coke Co.....	100
S. Colvin & Co.....	80	Fayette Coal Co.....	101
A. O. Tinstman & Co.....	127	Jackson Mining Co.....	63
Percy Mining Co.....	82	Laughlin & Co.....	116
Youngstown Coke Co.....	240	J. M. Schoonmaker.....	159
Lemont Furnace Co.....	120	Cochran, Son & Co.....	35
Stewart Iron Co.....	80	J. F. Dravo & Co.....	295
	1,594	W. J. Raney.....	40
		A. A. Hutchinson & Bro., , , ,	175
HICKMAN RUN BRANCH.			1,178
Cochran & Keister.....	100		
J. M. Schoonmaker.....	304		
J. S. Newmeyer & Son.....	40		
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CLEARFIELD REGION.

Statistics of the output since the beginning, show the increasing business done in the coal from this district. The returns are in tons of 2,000 lbs.

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1867.....	169,219	1875.....	928,297
1868.....	171,238	1876.....	1,281,861
1869.....	259,994	1877.....	1,374,927
1870.....	379,863	1878.....	1,295,201
1871.....	542,896	1879.....	1,631,120
1872.....	431,915	1880.....	1,739,873
1873.....	592,860	1881.....	2,401,987
1874.....	639,630		

The large increase during 1881 as compared with the preceding season is due to the improved condition of industrial pursuits of all and every nature within the State; the fact that work was continued uninterruptedly as against a 'strike' of eleven weeks duration in 1880, also has a bearing upon this matter of tonnage. Business in this quality of coal is also increasing, from tide-water, for there is a larger trade in Bituminous, and this coal takes its share of this increased demand for fuel, as a source of steam supply. As has been recorded in previous editions of this annual, the coal is used for steam purposes under stationary, marine, or locomotive engines; for making iron and steel rails; for glass works; in lime kilns; and many other purposes, being much liked wherever used; ignites freely, burns readily, and leaves a white ash. It is not easily friable, and bears transportation remarkably well. The analysis of Clearfield coal shows an average of about 70 per cent. carbon, and 22 per cent. volatile matter, leaving eight per cent. water, sulphur and ash. The highest percentage of carbon as per table of analyses made by Geological Survey, is 74.284 in coal from 'Franklin' colliery; 21.360 of volatile; 3.251 ash, and .670 moisture, with .435 of sulphur being the other constituents. There are half a dozen operators in this district that do the larger part of the business, and they are pushing the coal into market upon every occasion, aided by the very liberal policy of the Pennsylvania Railroad Company, in regard to freight charges.

During the year 1881, prices were fairly remunerative on the average, and \$3.75 at Philadelphia and \$4.35 at South Amboy is said to fairly represent the result. Mining was carried on at fifty cents per ton, and there was a scarcity of cars at all times. It is reported that transportation facilities were in arrears of the orders at every colliery. We include in this resume, and tonnage statement, the coal going over the Tyrone and Clearfield branch of the Pennsylvania Railroad, joining the main line at Tyrone 224 miles west from Philadelphia. New schemes for railroad lines to pierce this district, are of almost weekly occurrence, and there is no doubt but another outlet would be advantageous to the operators. We append a list of the collieries and the operators, but cannot obtain the tonnage of each colliery with any degree of accuracy, as the railroad company do not care to give it and the operators are buying and selling so much one from another that they claim such a return would not show the amount of 'business' done.

Morrisdale mines.....	R. B. Wigton & Sons.	Beaver mine.....	John Maurice & Co.
" " No. 2.....	" "	Philadelph. mine.....	P. G. Gallagher.
Decatur mines.....	Decatur Coal Co.	Penn mine.....	Reakirt Bro. & Co.
Derby mine.....	Thomas Barnes.	Beaver Run mine.....	Beaver Run Coal Co.
Glenwood mine.....	Geo. F. Huff & Co.	Sterling mine No. 2.....	R. H. Powel & Co.
Leonard mine.....	John Ashcroft.	Eureka mine No. 2.....	Berwind, White & Co.
Reading mine.....	Henry Liveright.	W. Moshannon mine.....	Moshannon Coal Co.
Logan mine.....	H. J. Smith & Co.	Lancashire mine.....	Campbell Tucker & Co.
Laurel Run mine.....	J. M. Bacon.	Coal Dale mine.....	R. H. Hipman & Co.
Mapleton mine.....	Berwind, White & Co.	Colorado mine.....	A. & W. H. Farlow.
Eureka mine No. 1.....	" "	Cody Ridge mine.....	H. K. Grant.
Reliance mine.....	W. A. Orbison.	Atlantic mine.....	Jno. Whitehead & Co.
Moshannon mines.....	Moshannon Coal Co.	Pacific mine.....	" "
Webster mines.....	J. C. Scott & Sons.	Victor mine.....	Victor Coal Co., Limited.
Goss Run mines.....	Berwind, White & Co.	Harrison mine.....	Beadling Bros.
Ocean mines.....	Jno. Whitehead & Co.	Empire mine.....	Empire Coal Co.
Excelsior mine.....	Fisher Bros. & Miller.	Columbia mine.....	Losee & Keller.
Sterling mine No. 1.....	R. H. Powel & Co.	Sterling mine No. 3.....	R. H. Powel & Co.
Powerton mine.....	W. J. Jackson.	Hawk Run mine.....	Jones, Mull & Co.
Franklin mine.....	Berwind, White & Co.	Sprng Hill mine.....	H. W. Under

## STATISTICS OF BITUMINOUS AND SEMI-BITUMINOUS COAL PRODUCTION OF PENNSYLVANIA, IN 1881.

IN TONS OF 2,000 LBS.

Blossburg.....	1,178,581
Barclay.....	451,806
McIntyre.....	236,922
Total Northern Pennsylvania region.....	1,867,309
Broad Top.....	294,819
East Broad Top.....	139,379
Snow Shoe.....	128,263
Clearfield.....	2,401,987
Total Central Pennsylvania region.....	2,874,448
Allegheny Mountain.....	303,707
West Pennsylvania Railroad.....	296,299
South-west Pennsylvania Railroad.....	29,548
Westmoreland.....	982,293
Pittsburgh.....	689,483
Johnstown Iron Works.....	500,000
Add for coke (2,615,563 tons) as coal.....	4,024,500
Total West Pennsylvania region, on Pennsylvania Railroad.....	6,826,160
Total of above.....	11,567,917

In addition to this, Somerset county, 200,000, McKean county, 150,000, and the western counties of the State, sufficient to make the sum total 20,000,000 tons, including coal for coking.

## McKEAN COUNTY, PA.

In this county there is a large deposit of prime Bituminous coal. There are two points from which coal is mined and marketed at present. At the eastern portion of the basin, the Buffalo Coal Company is at work near Clermont. The McKean and Buffalo Railroad, extending from Larabees on the Buffalo, New York and Philadelphia Railroad, gives an outlet for the coal of this section to Buffalo and Rochester, the distance from the mines being 108, and 150 miles respectively, to the points named. Output of coal by the Buffalo Coal Company, since the opening of the mines :

Year.	Tons.	Year.	Tons.
1875.....	33,501	1879.....	85,745
1876.....	81,830	1880.....	100,046
1877.....	73,222	1881.....	110,099
1878.....	72,098		

We give the following analyses of three samples from the Pennsylvania Geological Survey Report of 1875 :

Water.....	1.130	1.300	1.170
Volatile matter.....	33.090	33.830	35.440
Fixed Carbon.....	53.006	52.063	43.992
Sulphur.....	1.874	1.727	1.703
Ash.....	10.900	5.080	17,690

The Bradford branch of the 'Erie' railway runs into the central portion of this county, and there is a small tonnage originating on this line. We have the report of the Butts mines located at Alton and operated by J. E. Butts, Jr. The annual product is about 25,000 tons. The tonnage produced since the opening of the mines to the end of 1880, was 170,000 tons in all.

## COAL TRADE OF THE PENNSYLVANIA RAILROAD.

District.	Year 1880.	Year 1881.
East Broad Top .....	68,788	85,768
Huntingdon and Broad Top.....	114,898	150,388
Snow shoe.....	56,020	128,263
Tyrone and Clea field.....	1,718,957	2,332,621
Gallitzin and Mountain region.....	307,125	303,707
" " " coke.....	60,477	99,046
West Pennsylvania Railroad.....	291,135	296,222
" " " coke.....	79,114	124,471
Southwest Pennsylvania Railroad.....	43,039	29,548
" " " coke.....	1,149,389	1,421,883
Westmoreland region.....	943,177	982,293
" " " coke.....	138,803	295,766
Pittsburgh region.....	561,548	689,483
" " " coke.....	468,859	551,105

In addition to this, the Cumberland coal first carried by the H. & B. T. road 315,685 tons, and 1,431,708 tons of Anthracite ; there were also in 1881, 22 tons of coke from Broad Top, 80 tons from Clearfield, and 13,190 from Snow Shoe region. Total tonnage of this road, 6,793,743 *net* tons coal, and 2,515,563 *net* tons coke.



## NORTH PENNSYLVANIA SEMI-BITUMINOUS COAL FIELD.

In Bradford, Lycoming and Tioga counties, Pennsylvania, is found a superior quality of semi-Bituminous coal that has been worked for many years, and disposed of to the railways of New York State, to rolling mills and for blacksmithing purposes, with the best possible results, as to its economic use for the several purposes named. We have in this coal field, the Blossburg, McIntyre and Barclay districts. The first coal was sent to market from the Blossburg district, (the Bloss mines) in 1840. The business done by the several companies operating in the Blossburg District since the opening of the mines, in the year 1840, has been as below:—

Arbon Coal Company, 1840-43.....	49,633 net tons.
Wm. H. Mallory, 1844-57.....	405,113 net tons.
D. S. Magee, 1856-59.....	78,996 net tons.
Tioga Transportation Company.....	323,174 net tons.
Salt Company of Onondaga, 1863-66.....	267,809 net tons.
Morris Run Coal Company, 1864-82.....	4,891,623 net tons.
Fall Brook Coal Company, 1860-82.....	4,667,572 net tons.
Blossburg Coal Company 1866-82.....	3,178,586 net tons.

Total production of the district.....14,012,389 net tons.

## Production of the Blossburg district, during the years named.

Year.	Tons.	Year.	Tons.
1872.....	849,262	1877.....	602,245
1873.....	991,057	1878.....	652,597
1874.....	796,388	1879.....	874,010
1875.....	581,782	1880.....	921,555
1876.....	616,984	1881.....	1,178,581

There is a railway connection with the system of the "Erie," at Corning and Elmira, and with the "New York Central," at Syracuse, and Geneva and Lyons. By this means, there is a trade done wherever these lines extend to, or connect with.

The tonnage for 1881 was produced by the companies in the following quantities: Blossburg, 382,393; Morris Run, 378,503; Fall Brook, 417,685. The Blossburg Company own 200 coke ovens at Arnot, and they are producing an excellent article of coke thereat, selling it in all parts of the country. In December, 1881, the lands of the Blossburg Company were acquired by the 'Erie' Railway Company for its use and benefit.

At Ralston, in Lycoming county, Pa., on the line of the Northern Central Railway, (54 miles south from Elmira, N. Y.,) are the mines of the MCINTYRE COAL COMPANY. The coal is of the same general nature as that of the companies noted above. The company began operations in the year 1870, and 17,802 tons were shipped in that year.

Year.	Tons.	Year.	Tons.
1871.....	106,138	1877.....	183,715
1872.....	171,420	1878.....	154,205
1873.....	212,462	1879.....	127,632
1874.....	138,907	1880.....	216,225
1875.....	164,507	1881.....	236,922
1876.....	208,701		

In Bradford county are the mines of the TOWANDA COAL COMPANY, the SCHRADER COAL COMPANY, and the LONG VALLEY COAL COMPANY. The BARCLAY COAL COMPANY are now the owners of all the coal area in the Barclay district, (excepting the Schrader) and lease the mines and railroad to the "Towanda" and "Long Valley" Companies. The railway connection from Towanda, is by the Pennsylvania and New York Railroad north to the "Erie" at Waverly; the Southern Central, and the Geneva, Ithaca and Sayre at Sayre; south to the Lehigh Valley Railroad. We append details of the tonnage of this district.

*The Barclay Coal Company—1856-1867.*

Year.	Tons.	Year.	Tons.	Year.	Tons.
1856.....	2,295	1860.....	27,718	1864.....	62,058
1857.....	6,265	1861.....	40,835	1865.....	48,375
1858.....	17,560	1862.....	52,779	1866.....	37,963
1859.....	30,143	1863.....	54,535	1867.....	30,119

*The Fall Creek Coal Company—1865-1875.*

Year.	Tons.	Year.	Tons.	Year.	Tons.
1865.....	16,936	1869.....	4,303	1873.....	85,315
1866.....	29,604	1870.....	77,025	1874.....	21,281
1867.....	16,953	1871.....	129,095	1875.....	18,597
1868.....	6,595	1872.....	118,882		

*The Schrader Coal Company.*

Year.	Tons.	Year.	Tons.
1874.....	100,219	1878.....	149,285
1875.....	157,686	1879.....	144,946
1876.....	200,793	1880.....	216,802
1877.....	175,755	1881.....	210,664

The coal from this operation is sold mainly to the New York Central, to the Southern Central, and to the Geneva, Ithaca and Sayre Railroads.

*The Towanda Coal Company.*

Year.	Tons.	Year.	Tons.	Year.	Tons.
1865.....	7,886	1871.....	249,240	1877.....	164,344
1866.....	31,881	1872.....	263,960	1878.....	165,035
1867.....	27,668	1873.....	252,329	1879.....	237,608
1868.....	67,080	1874.....	215,572	1880.....	246,064
1869.....	176,307	1875.....	200,424	1881.....	223,172
1870.....	196,310	1876.....	160,343		

This coal goes to the "Erie" Railway for supply coal to their engines, etc.

RECAPITULATION OF OUTPUT OF COAL IN NORTHERN COAL FIELD, during the year 1881:—

Blossburg Coal Company.....	382,393 tons.
Morris Run Coal Mining Company.....	378,503 tons.
Fall Brook Coal Company.....	417,685 tons.
McIntyre Coal Company.....	236,922 tons.
Schrader Coal Company.....	210,664 tons.
Towanda Coal Company.....	223,172 tons.
Long Valley Coal Company.....	15,970 tons.
Fall Creek Coal Company.....	2,000 tons.

The total output thus amounted to—1,867,309 tons.

## THE KANAWHA, WEST VIRGINIA, REGION.

It is getting to be a very familiar tale, the relation of the extent of coal territory opened up and yet to be opened, in the district drained by the Kanawha and New River. Coal of all qualities, except Anthracite, is found in abundance and being easily mined, must gradually show an increased tonnage to the credit of the State of West Virginia. There is more coal being sent out by water, each and every year to the points of consumption on the Ohio River, and the Chesapeake and Ohio Railway is doing now double what it did in the year 1879. We are furnished with the following details of the business of the railway company—tons of 2,000 lbs:—

	<i>Cannel.</i>	<i>Gas.</i>	<i>Splint.</i>	<i>Steam.</i>	<i>Coke.</i>
Year 1881....	25,183	229,564	177,786	263,517	77,376
Year 1880.....	43,080	—	526,990	—	36,374

Of this coal and coke the following distribution was made:—

<i>Distribution.</i>	<i>Tons 1879.</i>	<i>Tons 1880.</i>	<i>Tons 1881.</i>
For use of C. & O. Railway Company.....	83,916	122,237	128,408
On line of road west of Richmond.....	29,651	57,598	131,787
At Huntington for shipment on Ohio River.....	77,662	105,399	111,476
To connecting railroads.....	33,103	57,353	112,021
At Richmond for consumption.....	52,976	47,043	79,501
At James River wharves for shipment.....	174,526	216,809	210,233
Total coal mined and carried.....	451,823	606,444	773,426

The large increase to connecting roads, is mainly fuel delivered to Elizabeth, L. & B. S. road; that on line west of Richmond is coke used in furnaces. Richmond City trade also shows a goodly increase. Coal and coke go to Louisville and St. Louis by rail, and sold at equal price with other grades. Coke making in West Virginia is growing to immense proportions, and will be one of the largest enterprises of the State. On New River, on the line of the Chesapeake and Ohio Railroad, there are now in operation about 1,000 ovens, and the different companies are building new ovens all the while. The demand for this coke greatly exceeds the supply. The coals of the New River and Raleigh county, on Piney River, are claimed to be the best coke coals in the United States. We append a few analyses of the coals mined and coke made, along the New River and Kanawha Valleys.

<i>Of the Coals.</i>	<i>Cannel.</i>	<i>Gas Coal.</i>	<i>Quinnimont.</i>	<i>Nuttallburg.</i>
Fixed Carbon.....	23.50	56.05	75.89	70.67
Volatile matter.....	53.00	35.75	18.19	25.35
Moisture.....	1.08	0.74	1.25	1.85
Ash.....	12.50	5.18	4.98	2.10
Sulphur.....	—	1.32	....	0.57
<i>Of the Cokes.</i>	<i>Sewell.</i>	<i>Nuttallburg.</i>	<i>Quinnimont.</i>	<i>Quinnimont.</i>
Fixed Carbon.....	93.00	91.22	93.85	91.72
Ash.....	6.73	7.53	5.85	5.09
Sulphur.....	0.27	0.92	0.30	0.48

The Chesapeake and Ohio Railway has been completed to Newport News, and extensive shipping facilities have been erected there for transferring the coal from the cars to the coastwise and other vessels. As 'The Virginias' says:—"The Great Kanawha basin is just now entering upon a career of development that is sure to soon make it, especially in the Western markets, a successful rival of the great city that hitherto has sat unchallenged Queen of Coal at the head of the Ohio." There has been a considerable influx of capital and brains into the district, and many new coal mining enterprises are in various stages of development.

## THE CUMBERLAND REGION.

The Cumberland (Georges Creek) coal field, located in Allegheny county, at the western extremity of the State of Maryland, supplies an important proportion of the semi-Bituminous coal reaching the seaboard markets. The connections with the tide-water markets are (1) via the Baltimore and Ohio Railroad, from the town of Cumberland 178 miles, and Piedmont, 206 miles west from Baltimore. (2) The Chesapeake and Ohio Canal, from Cumberland to Georgetown, 184 miles, and Alexandria 191 miles. The boats carry 110 tons, and make the trip in four or five days. The canal is owned by the State of Maryland, and is managed by a Board of Public Works. (3) The Pennsylvania State Line Branch, which taps the Cumberland and Pennsylvania Railroad near Mt. Savage (this gives an outlet to the Pennsylvania Railroad and its connections, for South Amboy, N. J.) (4) The Georges Creek and Cumberland Railroad, from the mines of the Maryland and American Coal Companies near Lonaconing, to Cumberland, thence by canal; and to the Pennsylvania Railroad.

Baltimore and Ohio Railroad began carrying this coal in 1842, the Chesapeake and Ohio Canal in 1850; the Pennsylvania State Line Branch in 1872. The Georges Creek and Cumberland in August, 1881.

The total business since the beginning, in 1842, to the end of 1881, foots up 39,893,986 tons, divided as below:—

Baltimore and Ohio Railroad.....	25,537,451 tons.
Chesapeake and Ohio Canal.....	12,901,634 tons.
Pennsylvania Railroad.....	1,459,901 tons.

We recapitulate the tonnage of the ten years past, to show the fluctuations of trade.

	<i>B. &amp; O.</i>	<i>C. &amp; O.</i>	<i>P. S. L.</i>	<i>Total.</i>
1872.....	1,517,317	816,103	22,021	2,355,471
1873.....	1,780,710	778,802	114,589	2,674,101
1874.....	1,576,160	767,064	67,671	2,410,895
1875.....	1,302,237	879,838	160,698	2,342,778
1876.....	1,070,775	632,410	131,866	1,835,051
1877.....	818,450	584,996	170,884	1,574,339
1878.....	924,254	609,244	145,864	1,679,322
1879.....	1,075,198	501,247	151,264	1,730,709
1880.....	1,319,589	603,125	213,460	2,136,160
1881.....	1,478,502	504,818	278,598	2,261,918

Labor in this region has always been well remunerated and there was no reduction in the price of mining the coal, from 1866, up to 1877; while on the other hand, the price of coal at the shipping points fell off about one-half within that period of time. We append a few statistics in this connection, showing the changes that have occurred:—

1855—June, 35 cents, at which rate it remained until August, when it was reduced to 30 cents.

1856—January, to May, 1862, 30 cents.

1862—In June advanced to 40 cents, and in September to 45 cents.

1863—January, to March, 1864, 50 cents.

1864—In April, advanced to 60 cents, and in June to 75 cents.

1864—September, to May, 1865, \$1.00

1865—In June, reduced to 75 cents, at which it continued to May, 1866.

1866—May reduced to 65 cents.

1877—In January reduced to 50 cents, advanced in August to 55 cents.

1878—March, 40 cents, at which it continued until October 15, 1879.

1879—October, 50 cents, at which rate till February, 1880.

1880—February, advanced to 65 cents.



During the year 1881, there was an increased output of coal at the mines in this region, and the outlook is for about three millions of tons during 1882. Prices did not average any more than for the preceding season, but there should be an improvement in this regard, for the coming season. We find the quotations averaged, at Batimore, about as below, by a statement prepared for the Treasury Department by one of the companies.

<i>Year.</i>	<i>Prices.</i>	<i>Year.</i>	<i>Prices.</i>	<i>Year.</i>	<i>Prices.</i>
1871.....	\$4 54	1875.....	\$4 35	1879.....	\$2 75
1872.....	4 52	1876.....	3 87	1880.....	3 75
1873.....	4 83	1877.....	3 15	1881.....	3 75
1874.....	4 70	1878.....	2 86		

The Georges Creek and Cumberland Railroad opened at the end of August, carried 213,180 tons, of which 83,136 tons went via Chesapeake and Ohio Canal, and outside of a small local trade, the remainder went to Philadelphia via the Pennsylvania Railroad, and this accounts for the largely increased business during 1881 via the Pennsylvania road.

Tolls upon coal over the Cumberland and Pennsylvania Railroad, during September, were reduced to one and a half cents per ton per mile.

A considerable trade in coal westward has been developed.

We find analyses of Consolidation coal:—81.96 fixed carbon, 13.920 volatile, 3.11 ash, and 1.01 water. Of Hampshire coal:—12.30 volatile, 79.50 fixed carbon, and 7.40 of ash.

Under the auspices of the West Virginia Central Railroad, the region south of the Baltimore and Ohio has been developed within the past year. There is an unbounded quantity of coal of prime quality in this new 'Elk Garden' country. An analysis of some coke made from this coal, gave 89.05 fixed carbon, 9.46 ash, 1.17 volatile.

Output at the several collieries included in this district, was as below, during 1880 and 1881.

<i>Companies.</i>	<i>Tons 1880.</i>	<i>Tons 1881.</i>
Consolidation Coal Company.....	568,244	753,930
New Central Coal Company.....	355,455	303,618
Georges Creek Coal and Iron Company.....	236,435	256,031
Maryland Union Coal Company.....	163,359	173,178
Borden Mining Company.....	159,374	165,448
Maryland Coal Company.....	113,993	123,677
American Coal Company.....	125,494	121,505
Potomac Coal Company.....	77,694	81,120
Davis Bros., West Virginia Mines.....	54,843	69,063
Hampshire and Baltimore Coal Company.....	99,032	63,132
Atlantic and Georges Creek Coal Company.....	65,442	59,645
Swanton Mining Company.....	42,124	42,745
Blair Avon Coal Company.....	45,020	25,295
West Virginia Central and Pittsburgh Railroad Company.....		11,256
Piedmont Coal and Iron Company.....	14,591	8,453
Union Mining Company.....	4,470	3,822
Miscellaneous.....	23,240	.....
<b>Totals.....</b>	<b>2,136,160</b>	<b>2,261,918</b>

Local trade, was 59,138 tons in 1881; the Baltimore and Ohio Railroad used 194,820 in locomotives, rolling mills, etc.

## BOSTON, MASS.

The receipts are shown below :—

<i>From</i>	<i>Tons, 1878.</i>	<i>Tons, 1879.</i>	<i>Tons, 1880.</i>	<i>Tons, 1881.</i>
Alexandria, Virginia.....	36,403	19,457	27,149	20,356
Georgetown, District of Columbia.....	53,046	61,140	79,520	77,781
Philadelphia, Pennsylvania.....	732,449	805,679	767,940	814,433
Baltimore, Maryland.....	173,432	219,681	239,887	232,931
Other places (New York ports, etc.).....	304,469	710,764	603,112	773,922
Great Britain.....	18,823	18,971	24,336	16,317
Nova Scotia.....	20,260	18,318	35,674	28,149
<b>Total.....</b>	<b>1,843,887</b>	<b>1,845,010</b>	<b>1,777,643</b>	<b>1,693,399</b>

The receipts of foreign and domestic coal at this port have been :—

<i>Years.</i>	<i>Foreign.</i>	<i>Domestic.</i>	<i>Years.</i>	<i>Foreign.</i>	<i>Domestic.</i>
1881.....	44,466	1,918,933	1876.....	32,628	1,147,576
1880.....	60,040	1,717,608	1875.....	32,444	1,200,578
1879.....	37,239	1,816,721	1874.....	51,438	1,125,516
1878.....	39,083	1,304,804	1873.....	87,700	1,076,673
1877.....	59,282	1,215,277			

This tonnage includes all the coal arriving at this port ; that for the home trade, and also for the points reached by railroads centering here. The following are the highest and lowest prices for Anthracite coal for the years named, as per statistics of the *Commercial List*:

<i>Years.</i>	<i>Prices.</i>	<i>Years.</i>	<i>Prices.</i>
1881.....	\$5 75 @ \$7 50	1878.....	\$5 00 @ \$6 50
1880.....	5 50 @ 6 50	1877.....	4 50 @ 7 00
1879.....	4 00 @ 6 50	1876.....	6 00 @ 8 25

The larger portion of the foreign coal was 'culm' from Nova Scotia, which is being introduced as a cheap steam fuel. A portion of the large increase from Philadelphia must be credited to the shipments of Bituminous (Cumberland and Clearfield) and this business is likely to still further increase. The shipments from New York ports indicates the changes that have taken place in the source of Boston's supply of Anthracite. Scranton, Lackawanna, etc., have taken the place of coal shipped at Philadelphia. It is a suggestive fact that the quantity of foreign coal is only 44,466 tons for all purposes, against 209,225 tons in 1865, when a total of only 747,000 tons were the receipts at this port. Freights from the shipping points were higher than in 1880, by one dollar per ton.

## CHICAGO, ILL.

The total receipts of coal at Chicago have been :

Year.	Tons.	Year.	Tons.
1871.....	1,081,472	1876.....	1,619,033
1872.....	1,398,024	1877.....	1,749,091
1873.....	1,668,257	1878.....	1,832,033
1874.....	1,359,496	1879.....	2,410,770
1875.....	1,641,488	1880.....	2,686,748
1881.....	3,478,478		

The receipts by Lake have been:—

ANTHRACITE		BITUMINOUS.	
1870.....	340,730 tons.	1870.....	181,850 tons.
1872.....	495,765 tons.	1872.....	90,820 tons.
1873.....	538,837 tons.	1873.....	199,107 tons.
1874.....	395,080 tons.	1874.....	261,790 tons.
1875.....	518,971 tons.	1875.....	272,831 tons.
1876.....	362,373 tons.	1876.....	334,055 tons.
1877.....	442,325 tons.	1877.....	360,158 tons.
1878.....	325,553 tons.	1878.....	404,447 tons.
1879.....	464,876 tons.	1879.....	300,324 tons.
1880.....	419,823 tons.	1880.....	266,544 tons.
1881.....	565,161 tons.	1881.....	274,431 tons.

The receipts of Anthracite by rail have grown until they are now nearly equal with the receipts by water. A few years since there was none by rail. Our figures for last year are 538,698 tons by rail, or a total of something over a million tons as the receipts of Anthracite at Chicago. The aggregate coal business has doubled in five years. The Bituminous coal by rail far exceeds that by water, having aggregated 2,090,188 tons last year. It will be seen that there is an enormous home consumption of fuel at this point, for the reshipments to interior points was but 683,849 tons of all kinds. Coal is sent from this point to places in Michigan, Wisconsin, Nebraska, Minnesota, and even Dakota. Shipments of Anthracite coal to a much greater extent than formerly, are now made direct from the mines, much of it not touching Chicago, although sold by Chicago dealers. Were such sales included in the figures above given the aggregate would be immensely increased.

Anthracite was in heavy demand all the year as stocks were completely exhausted in the early part of the year, and the aggregate supply at the close of the year was 100,000 tons. The lakes were not open to navigation at least a month beyond the usual date and receipts were less by this avenue than they would have been. Freights were high throughout the season. The completion of the unloading and transfer facilities at South Chicago will tend to increase the lake receipts and enable the dealers to supply the western demand for Anthracite with greater promptness. We recapitulate the business, premising that of the Bituminous, some 975,000 tons was Illinois, and 375,000 tons Indiana, the remainder being Youghiogheny, and Ohio coal.

Receipts.	Tons 1879.	Tons 1880.	Tons 1881.
Anthracite by rail.....	375,715	359,458	538,698
Anthracite by lake.....	464,876	419,823	565,161
Bituminous by rail.....	1,266,676	1,640,923	2,090,188
Bituminous by lake.....	300,324	266,544	274,431
Re-shipments.....	498,324	618,027	683,849

## BALTIMORE, MD.

The coal trade of this city increases year by year, and there is every probability of a larger business during 1882, than heretofore. We give a few statistics :

The shipments of Bituminous coal, foreign, were as below :

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1872.....	54,363	1877.....	27,189
1873.....	59,546	1878.....	32,804
1874.....	70,675	1879.....	28,059
1875.....	33,460	1880.....	52,356
1876.....	27,336	1881.....	40,356

The Northern Central Railroad carried the following Anthracite :

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1872.....	244,757	1877.....	343,936
1873.....	242,754	1878.....	310,042
1874.....	232,938	1879.....	412,169
1875.....	276,784	1880.....	335,356
1876.....	263,954	1881.....	522,976

The Baltimore and Ohio carried the following Bituminous to Locust Point :

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1875.....	1,460,874	1879.....	1,054,684
1876.....	1,141,689	1880.....	1,231,563
1877.....	966,668	1881.....	1,725,246
1878.....	1,087,785		

At Locust Point, the terminus of the Baltimore and Ohio Railroad, the Bituminous coal from the Cumberland region of Maryland, the Gas coal regions of West Virginia, the Somerset county mines, and the Youghiogheny Gas coal of Pennsylvania is shipped North, and the above-mentioned receipts includes this coal so shipped, and that for local use. The quantity of coal received at Canton, via the Pennsylvania Railroad system is large and increasing, but we have not the details. There was about 500,000 tons of Gas coal received, including that for shipment, and that for local use ; this came from the West Virginia mines, along the Baltimore and Ohio, and from the Ocean Youghiogheny mines, in Pennsylvania, via Baltimore and Ohio Railroad.

Of Anthracite coal there was received perhaps, one hundred thousand tons by water, in addition to the coal via the Northern Central Railroad. During last year transfer facilities were erected at Locust Point for putting Anthracite coal into the return box cars of the B. & O. road, for Western delivery. This coal is received by boat or steamer from Philadelphia, and every facility for doing a large business, is available.

The range in price of Cumberland coal at this port is as stated below :

<i>Year.</i>	<i>Price.</i>	<i>Year.</i>	<i>Price.</i>	<i>Year.</i>	<i>Price.</i>
1871.....	\$4 72	1875.....	\$4 42	1879.....	\$2 75
1872.....	4 66	1876.....	3 93	1880.....	3 75
1873.....	4 85	1877.....	3 34	1881.....	3 75
1874.....	4 63	1878.....	3 00		

Baltimore and Ohio Railroad is growing to be one of the large coal carriers in the Union. By the annual report for the year ending with September last, it appears that the Ohio lines carried 378,917 tons ; the Pittsburgh Division 1,980,102 tons, and the main line 2,180,608 tons ; an aggregate of 4,539,627 tons, as compared with 4,388,356 tons the preceding year.



## NEW ORLEANS, LA.

The coal brought to this market is almost exclusively Pittsburgh coal. The flats and barges are towed by powerful tow-boats built expressly for that purpose. The towing between Pittsburgh and Louisville depends on the state of the river. When the stage of water is too low for navigation, which it frequently is for weeks, and even months, the supplies at the lower points become deficient, and prices naturally advance, often reaching very high prices. The coal flats and barges sent to New Orleans are generally dropped at Willow Grove, near Greenville, just above the city, where they are superintended for the owners or agents. When a boat or barge is wanted, a small city tug-boat is sent to tow it to the city, or to its destination on the coast. Messrs. C. A. Miltenberger & Co. give the following as the consumption of Pittsburgh coal :

<i>Year.</i>	<i>Bbls.</i>	<i>Year.</i>	<i>Bbls.</i>
1870.....	3,203,500	1876.....	2,802,700
1871.....	3,112,000	1877.....	3,014,200
1872.....	2,991,500	1878.....	2,999,600
1873.....	2,821,507	1879.....	2,421,100
1874.....	2,749,500	1880.....	3,187,400
1875.....	2,448,000	1881.....	3,627,100

The distance from Pittsburgh to New Orleans is some 2,000 miles, and the cost of towing is about four and one-half cents per bushel, and this, in addition to the high cost at Pittsburgh, makes it necessary to have a better rate at the lower ports than has heretofore prevailed. The arrivals for the season ending with November, 1881, were 394 boats and 4 barges, and the consumption is put at 382 boats and 43 barges. Average price 44½ cents per barrel. Eleven barrels to a ton of 2000 lbs., nearly. The coal sent to planters below the city is included in the consumption, while that left on the coast above is not considered. Of the 43 pieces consumed, designated as barges, four were French Creeks or small boats. Average contents—boats about 9,000 bbls.; barges 4,500 bbls.; French Creeks 3,400 bbls. The season just closed has proven to be a most satisfactory one to the wholesale dealers of Pittsburgh coal, as evidenced by the increased demand and the remunerative prices prevailing. The consumption has been in excess of any previous year, by 310,000 bbls., and the average wholesale price (44½c. per bbl.) better than any year since 1873, when the average figure reached nearly 60c. per bbl. To the increased number of foreign steamers plying to this port, the rapid growth of manufacturing industries in this city, and the demands for family use occasioned by the unusual severity of the winter of 1880-81, together with the general improvement in all branches of trade, may be attributed the increased consumption of coal for the past season.

## BUFFALO, N. Y.

Buffalo is the most prominent of the Lake ports, as a coal shipping point ; the tonnage is growing yearly into proportions which show that this city is bound to maintain its pre-eminent position. The varieties received here number all the Anthracite qualities, and the Reynoldsville, Fairmount, Cameron, Blossburg, McKean county, and other Bituminous coal. Of the Anthracite received during 1881, there were 825,240 tons shipped by lake ; and by rail West and into Canada, 350,000 tons. The quantity of Bituminous consumed in the city, for various purposes was 500,000 tons ; and of hard coal 50,000 tons for manufacturers and 200,000 tons for domestic consumption.

Receipts have been as below :—

Year.	Blossburg.		Bituminous.		Anthracite.	
	By Rail.	By Canal.	By Lake.	By Rail.	By Canal.	By Rail.
1873 . . . . .	80,000	125,000	87,724	190,000	255,944	479,885
1874 . . . . .	50,000	70,000	67,467	140,000	253,262	320,000
1875 . . . . .	75,000	45,000	32,767	350,000	250,206	500,000
1876 . . . . .	25,000	30,000	21,418	297,842	151,175	350,000
1877 . . . . .	50,000	10,000	44,247	214,200	209,609	550,000
1878 . . . . .	45,000	3,353	50,001	425,973	115,162	660,000
1879 . . . . .	60,000	2,000	36,648	637,023	92,134	1,000,000
1880 . . . . .	65,000	1,777	13,078	800,000	83,240	850,000
1881 . . . . .	65,000	500	7,860	923,919	181,292	1,075,000

SHIPMENTS OF ANTHRACITE, west via the Lake :—

1873 . . . . .	510,443 tons.	1877 . . . . .	405,074 tons.
1874 . . . . .	344,500 tons.	1878 . . . . .	306,172 tons.
1875 . . . . .	339,722 tons.	1879 . . . . .	550,646 tons.
1876 . . . . .	321,455 tons.	1880 . . . . .	554,670 tons.
1881 . . . . .	825,240 tons.		

Distances from Bituminous coal mines to this city, by rail :—Bell, Lewis and Yates, 186 miles ; Hamilton Coal Company, 194 miles ; F. Williams & Co., (Du Bois,) 185 miles ; (Reynolds,) 193 miles ; Powers, Brown & Co., 194½ miles ; Sandy Lick Coal Company, 185 miles ; Fairmount Coal Company, 234 miles ; Catfish mines, 198 miles ; Stoneboro, 204 miles ; St. Mary's Coal Company, 143 miles ; Cameron, 125 miles ; Buffalo Coal Company, 108 miles.

During 1881, there was 29,222 tons Bituminous coal sent East by canal, and 30,000 tons of Blossburg coal was sent by lake from this city. Coal freights from Buffalo to Chicago during the season of navigation were very irregular, though much higher than those of 1880. The ruling figure in May was 75c., though several cargoes were shipped as low as 60c. During the month of June the rate ranged from 85c. @ \$1.00. The remainder of the season coal was carried at from \$1.00 @ 1.50, averaging about \$1.25. The few closing cargoes which reached Chicago in the last days of November and early in December paid \$1.75 @ 2.00. The average rate for the year was \$1.15.

The new railway schemes looking toward Buffalo as a terminal point, many of them passing through coal regions, will add to the importance of this city as a coal shipping centre. The New York, Lackawanna & Western will no doubt have its line completed about July, 1882, and the Lehigh Valley is locating a line from Waverly to Buffalo.

## PITTSBURGH, PA

As the activity in industrial pursuits, of which this city is such a hive, continued during the year last past, consumption of coal and coke may be safely put at two millions of tons. Rates averaged somewhat higher as the wages for digging were higher ; we give details of both these points on the succeeding page. The operations are large, as the shipments of ten counties pay tribute to the capital and brains of those engaged in the industry, who have their headquarters at this point. The Monongahela Navigation Company did a tonnage of 3,450,186 *net* tons of coal and 150,000 *net* tons of coke, and this goes to supply in part, the cities below all the way to New Orleans. We give further details of the business on page 22, and also a special chapter on Connellsville coke at pages 25—26. In the coke-making business there are firms owning thousands of ovens, who make it for sale, and there are also mines and ovens producing this coke for use at furnaces. The tonnage reported as being done by the 'railroad' mines last year, was largely in excess of any preceding one. It is stated that the capacity of the mines shipping by water is a million bushels of coal daily, and if they had full work for ninety days, they would supply the entire trade dependent upon the Ohio river. Nearly all the mines located in this vicinity are what are termed drifts, and the mining and shipping entails but little expense to the proprietors, and hence this coal finds a market in such distant points at remarkably low rates. A division of the trade seldom noticed, is the special collieries for mills whose mines are contiguous ; the coal being run into the yards of the mills from the mines. There are many railway lines centering here and ramifying the coal districts, and from all accounts there will be more before the close of another year. It is a matter of fact that one-tenth of the entire Bituminous coal production of the United States comes from Allegheny county. We know of no city which is so essentially a coal centre as Pittsburgh, and the operators are active, energetic and pushing men. The mines along the railroads have more steady employment than those along the river, but the rates paid do not vary as much as this circumstance would suggest. Notwithstanding the shipments from points below this city, along the Ohio and the Kanawha rivers, the coal from Pittsburgh still maintains its supremacy and the ability to compete in quality does not appear to bring about an equal price for the commodity. Pittsburgh coal is supreme as a fuel, from Cincinnati to New Orleans, and thus will remain while it costs less than one dollar a ton to carry and deliver the coal from Pittsburgh to New Orleans. When the fleets arrive at Louisville, they are depleted very largely, and then there are Cairo, Memphis and Natchez each taking a pull at the tonnage. We give details of the business at Louisville and New Orleans, each under its proper head ; Pittsburgh coal is used for gas making in all the Western cities, and many of the Eastern towns and cities are also supplied with coal from the same seam.

## PRICE OF COAL AT PITTSBURGH, PA.

PRICE OF COAL RUN OVER  $1\frac{1}{2}$  INCH SCREEN, F. O. B. CARS UNION YARD, PITTSBURGH, PA. - THE E

PRICES ARE FOR ONE HUNDRED BUSHEL, 76 LBS. PER BUSHEL.

Months.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.
January.....	\$7 50	\$9 50	\$8 00	\$5 50	\$5 50	\$6 00	\$5 75	\$5 00	\$6 75	\$7 00
February.....	7 50	9 50	7 50	5 50	5 50	5 75	4 75	5 25	7 00	7 00
March.....	7 50	9 50	8 00	6 50	5 25	5 75	4 75	5 00	6 75	7 00
April.....	7 50	9 50	8 00	6 50	5 25	5 75	4 75	4 75	c6 75	7 00
May.....	7 50	9 50	8 00	6 25	5 25	5 75	4 75	4 75	6 00	6 50
June.....	7 50	9 50	7 50	6 25	5 25	5 25	4 75	4 75	5 75	6 50
July.....	7 50	9 50	7 50	6 00	5 25	5 25	4 00	4 75	5 75	6 00
August.....	7 50	9 50	7 50	6 00	5 25	5 75	4 00	4 75	5 75	6 00
September.....	8 00	9 50	7 00	5 50	5 25	5 75	4 00	4 75	5 75	6 50
October.....	8 75	9 50	7 00	5 50	5 25	5 75	4 25	5 50	6 25	7 40
November.....	A9 50	8 50	7 00	5 50	5 25	5 75	4 25	B6 60	6 60	7 40
December.....	9 50	8 50	6 50	5 50	4 75	5 75	4 25	6 00	6 50	7 25
Average.....	7 98	9 33	7 46	5 87	5 25	5 60	4 52	5 15	6 29	6 79

General average for ten years is \$6.42 - Average for last five years is \$5.67.

A - Price made by Railroad Coal Exchange for November, 1872 until November, 1873.

B - Price advanced on account of decision of Arbitrators.

c--Price until April 26th ; then reduced to \$6.00.

Above prices are for coal delivered in Individual cars only.

## PRICES PAID FOR MINING PITTSBURGH COAL.

PRICE OF COAL MINING ON RAILROADS ENTERING CITY OF PITTSBURGH FOR COAL RUN OVER A  $1\frac{1}{2}$ 

INCH SCREEN--PER ONE HUNDRED BUSHEL, 76 LBS. PER BUSHEL.

Mont's.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.
January.....	\$4 00	\$5 00	\$4 00	\$2 75	\$2 50	\$3 00	\$2 66	\$2 66	\$3 50	\$3 50
February.....	4 00	5 00	4 00	2 50	2 50	3 00	2 66	2 66	3 50	3 50
March.....	4 00	5 00	4 00	3 00	2 50	2 50	2 66	2 50	3 50	3 50
April.....	4 00	5 00	4 00	3 00	2 50	2 50	2 50	2 28	c3 50	3 50
May.....	4 00	5 00	3 75	3 00	2 50	2 50	2 50	2 28	3 00	3 50
June.....	4 00	5 00	3 50	3 00	2 50	2 50	2 50	2 28	3 00	3 50
July.....	4 00	5 00	3 50	3 00	2 50	2 50	1 90	2 28	3 00	3 50
August.....	4 00	4 00	3 50	3 00	2 50	3 00	1 90	2 28	3 00	3 50
September.....	4 00	4 00	3 25	2 50	2 50	3 00	2 28	2 40	3 00	3 50
October.....	4 50	4 00	3 00	2 50	2 50	3 00	2 28	2 75	3 50	4 00
November.....	5 00	4 00	3 00	2 50	2 37	3 00	2 28	B3 50	3 50	4 00
December.....	5 00	3 20	3 00	2 50	A2 00	3 00	2 28	3 00	3 50	4 00
Average.....	4 20	4 51	3 55	2 77	2 45	2 79	2 36	2 57	3 29	3 62

Ranged from \$1.75 (in December 1876) to \$5.00 (1872 and 1873.)

A--Three prices this month viz \$1.75--\$2.00 and \$2.25--average \$2.00.

B--Paid according to decision of Board of Arbitrators.

c--\$3.50 until April 26th ; then reduced to \$3.00.

General average --for ten years \$3.21-- for last five years \$2.93.

At mines that pay for the unscreened coal, the price is adjusted as follows --8 cents per ton of 2,000 lbs. for each 50 cents per 100 bushels, of  $1\frac{1}{2}$  inch, screen coal.



## LOUISVILLE, KY.

There is a very large business done in coal at this point, and an actual consumption of 700,500 tons of fuel shows an activity within the corporate limits. A few dry statistics are in place at this juncture.

Arrivals of Pittsburgh coal during the year 1881—270 steamers, with 968 boats, 1,179 barges; 436 nut and slack; 81 coke barges; this equalled 40,500,000 bushels or 1,500,000 tons. Average tonnage to each steamer, 5,500 tons. Now there is a heavy business done in forwarding coal to points below Louisville. This amounted to 853 boats, 359 barges coal, 192 nut and slack, and 50 coke barges, aggregating 25,400,000 bushels, by 74 steamers, or an average to each of 12,800 tons. Kentucky coal by rail, 8,825 cars or 114,000 tons. Ohio river coal 130 boats, or 50,000 tons. Anthracite, 579 cars or 8,106 tons.

Recapitulation of consumption during 1881, in tons:

<i>Coal.</i>	<i>Coke.</i>
Pittsburgh..... 500,000	Connellsville.... 13,000
Ohio river..... 50,000	City made..... 4,000
Kentucky..... 123,500	Gas company..... 8,109
Anthracite..... 7,244	

Pittsburgh shippers claim that coal was worth seven cents a bushel to start with, and towing to Louisville cost two cents a bushel, and yet coal was offered at nine cents a bushel, or \$2.37 a ton, and Ohio river and Kentucky coal at two cents a bushel less. Anthracite sold at \$9.00 a ton.

## MILWAUKEE, WIS.

There is a growing business in coal of all kinds at this city, and last year half a million tons were received for consumption in the city and adjacent territory. Of this amount 200,000 tons was Anthracite, received from Oswego, Buffalo and Erie. The remainder was Bituminous from Illinois or Ohio, shipped at Cleveland, Ashtabula, etc. About 75,000 tons were sent to interior points by rail. The following show the receipts of coal of all kinds, by lake and rail.

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1870.....	122,865	1876.....	188,444
1871.....	175,526	1877.....	264,784
1872.....	210,194	1878.....	239,667
1873.....	229,784	1879.....	350,840
1874.....	177,655	1880.....	368,568
1875.....	238,674	1881.....	500,000

## MONTREAL, P. Q.

Notwithstanding the increased business done in Nova Scotia coals, there is more Anthracite coal going into Canada every year. The duty of fifty cents a ton does not appear to retard the use of this quality of fuel. We give comparative statistics, in tons of 2,000 lbs.:

	<i>Tons 1881.</i>	<i>Tons 1880.</i>
Anthracite from U. S.....	135,549	169,495
Bituminous from Great Britain.....	58,408	41,045
Bituminous from Nova Scotia.....	135,000	177,075

## MOBILE, ALABAMA.

Receipts are increasing each year, as the comparative statistics show, and the coal from the State is gradually displacing all other qualities. Prices retail last year were. Anthracite \$8 to \$11; Alabama \$6 to \$9; Pittsburgh \$9 to \$11, per net ton. Yearly statement is to the end of August.

	1881.	1880.	1879.	1878.	1877.
Tons, Alabama coal.....	8,924	5,396	3,015	1,349	1,466
Tons, Pennsylvania and English coal.....	2,701	1,033	3,352	2,689	8,069

## ST. LOUIS, MO.

The coal tonnage of this city is increasing at a very rapid rate; taking coal and coke, there was just twice as much received in 1881, as during the year 1874. By far the largest proportion of the Bituminous received at this city is from the Belleville district, in St. Clair county, Illinois. The principal seam worked is five to seven feet in thickness, and it is economically mined. Analysis of this coal shows—water, 6; volatile matter, 38.8; fixed carbon, 52.2; ash, 5.

Mr. Geo. H. Morgan sends us the following statement of the receipts of coal at St. Louis, for the year 1881, with a comparison from 1872:—

By Ohio and Mississippi Railroad .....	5,209,100 bushels.
By Indiana and St. Louis Railroad.....	3,307,600 bushels.
By St. Louis, Vandalia and T. H. Railroad.....	7,360,400 bushels.
By Cairo Short Line Railroad.....	8,699,700 bushels.
By Wabash Railroad.....	2,895,650 bushels.
By Louisville and Nashville Railroad.....	5,363,450 bushels.
By Illinois and St. Louis Railroad.....	6,035,975 bushels.
By Cairo and St. Louis Railroad.....	2,633,100 bushels.
From Ohio River, (Pittsburgh).....	1,602,025 bushels.
From St. Louis county—estimated.....	800,000 bushels.
By St. Louis, Alton and Chicago Railroad.....	289,100 bushels.
From Grand Tower.....	578,975 bushels.

Total..... 44,720,175 bushels.

Twenty-five bushels of eighty pounds each to the ton of 2,000 lbs., gives a total of 1,788,807 tons.

The receipts of coke which is not in above account, in 1879, were 4,173,500 bushels, 9,457,100 in 1880, and 12,860,700 bushels in 1881, or say 514,000 net tons. A recapitulation of the coal trade is given below:—

Year.	Bushels.	Year.	Bush ls.
1872.....	24,557,425	1877.....	35,866,850
1873.....	32,608,795	1878.....	32,087,300
1874.....	29,823,000	1879.....	36,978,150
1875.....	32,466,600	1880.....	41,892,356
1876.....	32,073,125	1881.....	44,720,175

The quantity of Anthracite dealt in at this city, is stated to have been 42,000 tons during last year. The coke is mainly from the Carbondale Coal and Coke Company, ovens in Illinois, and it sells largely in place of Connellsville.

## PROVIDENCE, R. I.

The receipts of coal at this point, in tons of 2,240 lbs., in 1881, were 788,604 tons of all kinds. Details of receipts are as below :—

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1871.....	517,996	1877.....	613,295
1872.....	633,387	1878.....	530,767
1873.....	637,344	1879.....	712,973
1874.....	539,168	1880.....	687,552
1875.....	603,510	1881.....	788,604
1876.....	552,114		

It will be noticed that there was a large increase during 1881, due to the continuous employment in manufactories of all descriptions, and increased use of steam power. We have not the figures divided into Anthracite and Bituminous, but find that all but 759 tons was coal produced in the United States.

## NEW YORK CITY.

It is safe to say that the consumption of coal in, and received at New York City, is annually something over five and a quarter million tons. We find by experience that the consumption of domestic fuel will average in cities, two tons per inhabitant per year; this gives 2,500,000 tons of Anthracite for this purpose. To be added to this say 1,000,000 tons of Anthracite for steam purposes generally; factories, ferry-boats, river and coasting steamers. Of gas coal there are 300,000 tons annually consumed for the purpose of affording light to the inhabitants. Of Bituminous and Semi-Bituminous for steam uses, to the railways, steamers and factories generally, say 1,250,000 tons. We may add at least 100,000 tons of Bituminous for household uses. The smaller sizes of Anthracite are largely used for steam raising, both under stationary and marine boilers. The imports of foreign coal last year were 58,161 tons, apart from the coal brought over by ocean steamers for their return voyage, either in whole or in part. Every building in which there are elevators adds to the consumption of coal in this city; the elevated railroad systems are said to use 150,000 tons annually. Bituminous coals from Maryland, Virginia, Pennsylvania, Ohio and Great Britain and Nova Scotia are received here, and of the Pennsylvania coals there are all grades and qualities.

## NEW HAVEN, CONN.

The receipts of coal of all kinds, at this point, during 1881, figure up about twenty per cent. more than in 1880. We put tonnage at 725,000 tons, as against 600,000 tons in 1880, and 458,700 tons in 1878.

## BRIDGEPORT, CONN.

Receipts during 1881, say 225,000 tons, as against 180,000 in 1880 and 200,250 tons in 1879, and 144,580 tons in 1878.

SAN FRANCISCO, CAL.

The statements given below will serve to indicate the consumption of the several varieties of coal at San Francisco. The principal sources of supply are from Mt. Diablo, in the immediate vicinity; from Coos Bay in Oregon; and Seattle in Washington Territory; from Vancouver Island; from Australia and Great Britain; as also Cumberland and Anthracite, from the Atlantic coast; coal has also been received in small quantities from Chili, and Tacoma. The domestic sources of supply furnish but a small proportion of the sum total.

Year.	Tons.	Year.	Tons.
1860.....	77,635	1871.....	315,194
1861.....	116,245	1872.....	434,467
1862.....	120,545	1873.....	454,582
1863.....	135,550	1874.....	531,947
1864.....	167,298	1875.....	538,209
1865.....	150,147	1876.....	648,3-8
1866.....	192,601	1877.....	576,760
1867.....	248,925	1878.....	626,834
1868.....	282,025	1879.....	618,519
1869.....	328,973	1880.....	654,118
1870.....	320,493	1881.....	899,680

Qualities.	Tons 1879.	Tons 1880.	Tons 1881.
FOREIGN. Australian.....	80,175	59,873	126,296
English.....	36,588	66,660	281,313
Vancouver.....	160,142	169,162	158,629
EASTERN. Anthracite.....	21,982	19,629	13,697
Cumb. land.....	1,777	20,916	24,982
DOMESTIC. Mount Diablo.....	134,435	158,723	193,055
Coos Bay.....	45,909	35,415	21,246
Seattle.....	135,012	123,741	152,893

The course of the coal trade at this point is governed by the amount of grain raised in the adjacent country. A heavy crop means an influx of vessels from Australia and Great Britain, and they bring coal as part of an inward cargo. As will be noticed, the receipts are very largely in excess of preceding years; the increase is entirely in foreign coals. Consumption is kept pretty near to the supply, and rates are fairly held at all times. The trade will no doubt soon equal one million tons per annum.

A coal said to be equal to that of Maryland, is found near Puget Sound (30 miles from Tacoma) and one of the veins has been named the Pacific Cumberland. There were 17,339 tons received from Tacoma, last year. The railroads leading North and South from San Francisco, must have coal from this port, and as they are advancing into the interior, they will yearly require more and more coal.



## CINCINNATI, OHIO.

The coal received at this city includes Youghiogheny; Ashland, Ky.; the Pomeroy from the vicinity of Pomeroy, Ohio; Hocking Valley, Ohio; Muskingum Valley, Ohio; Ohio river; the Kanawha from West Virginia, including the Splint, Bituminous and Cannel, and the Anthracite from Pennsylvania. The years end with August.

<i>Year.</i>	<i>Net tons.</i>	<i>Year.</i>	<i>Net tons.</i>
1854.....	302,148	1868.....	648,143
1855.....	383,555	1869.....	944,444
1856.....	277,777	1870.....	1,122,222
1857.....	537,037	1871.....	850,814
1858.....	515,555	1872.....	1,140,399
1859.....	458,988	1873.....	1,010,018
1860.....	540,740	1874.....	1,305,285
1861.....	462,962	1875.....	1,311,488
1862.....	314,814	1876.....	1,489,108
1863.....	296,296	1877.....	1,468,619
1864.....	591,680	1878.....	1,441,754
1865.....	609,889	1879.....	1,269,339
1866.....	667,514	1880.....	1,787,230
1867.....	683,195	1881.....	1,492,817

Pittsburgh coal, afloat, averaged \$2.60 per ton for last year, and Anthracite was sold, delivered, at an average of \$8.03 per ton.

The shipments of coal from the city to interior points footed up some 436,920 tons, so that the coal retained for consumption was 1,055,997 tons. The relative proportions of the several varieties were: Pittsburgh 57.7 per cent; Kanawha river 26.8 per cent; Ohio river 7.7 per cent. Anthracite footed up 30,821 tons, as against 28,483 tons in 1880. Coke sells largely, and the receipts were 2,697,482 bushels, not including 2,082,800 bushels made at the Cincinnati and Covington gas works.

## CITY OF QUEBEC.

We have returns showing that 11,151 tons of Anthracite from the United States; 672 tons Anthracite from Great Britain; 81,156 tons Bituminous from same; 13,598 tons Nova Scotian coal were received at this city during the year 1881. There was also 986 tons of coke from Great Britain. All the tons are those of 2,000 lbs.

## BROOKLYN, N. Y.

In the census year, ending May 31, 1880, it was reported that coal was used as below:—

Anthracite by various manufactures.....	412,718 tons.
Public uses, not manufactures ..	101,929 tons.
Domestic consumption.....	800,000 tons.
Bituminous coal, various purposes.....	111,535 tons.
Gas coke sold for consumption 75,623 chaldrons.	

ERIE, PENNA.

There is a business done in coal at this city, of 650,000 tons annually. The local consumption amounts to 240,000 tons, and the remainder is forward West, by rail and vessel, from this city. The following details of the trade for 1880, will serve to show the course of trade.

<i>Carried by.</i>	<i>Anthracite.</i>	<i>Bituminous.</i>
Philadelphia and Erie Railroad.....	234,880 tons.	58,253 tons.
Erie and Pittsburgh Railroad.....	—	167,000 tons.
L. S. & M. S. R. R.....	—	194,396 tons.

SHIPMENTS.

By Lake.....	80,793 tons.	119,500 tons.
By Rail.....	111,228 tons.	102,896 tons.
Erie local use.....	42,854 tons.	197,253 tons.

The shipments by Lake have been as below:—

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1870.....	312,081	1876.....	233,012
1871.....	377,457	1877.....	232,326
1872.....	350,159	1878.....	224,513
1873.....	325,711	1879.....	271,535
1874.....	217,500	1880.....	200,298
1875.....	174,672		

RICHMOND, VA.

This city is assuming considerable importance in the coal trade, through the efforts of the Chesapeake and Ohio Railroad. We append statistics of the total coal business of the railroad company.

<i>Quality.</i>	<i>Tons 1878.</i>	<i>Tons 1879.</i>	<i>Tons 1880.</i>	<i>Tons 1881.</i>
Cannel.....	47,699	33,261	43,080	25,183
Splint and Bituminous.....	277,041	395,509	526,990	670,867
Coke.....	17,700	23,063	36,371	77,376
Total.....	342,440	451,833	606,444	773,426
Shipments of coal to Eastern cities were.....	140,921	174,526	216,809	210,233

The following statement of coal receipts at the Richmond market, for the city consumption, taken from official returns, will not be without interest:—

<i>Character of coal.</i>	<i>Tons 1878.</i>	<i>Tons 1879.</i>	<i>Tons 1880.</i>	<i>Tons 1881.</i>
Chesapeake and Ohio.....	54,552	64,117	47,043	79,501
Anthracite and Cumberland.....	39,709	60,120	70,000	75,000
Chesterfield, etc., etc.....	34,621	40,377	50,000	50,000
Totals.....	128,882	164,614	167,013	204,501

Anthracite in 1881, was 52,722 tons.

KANSAS CITY, MO.

The receipts of all kinds of coal at this city during 1881, aggregated 390,603 tons as compared with 329,962 tons in 1880. Much more hard coal was brought into the city last year than in any preceding year, and the consumption of this variety of fuel is constantly growing. Main source of supply of soft coal is Summit and Rich Hill.

## CLEVELAND, OHIO.

The total receipts of coal at Cleveland, from 1828 to 1852, amounted to 662,862 tons; having increased from thirty tons in 1828, to 137,926 tons in 1852; we have no details from that date until 1865, but the following will serve to show the growth of the trade:

Year.	Tons.	Year.	Tons.
1865.....	465,550	1874.....	1,215,353
1866.....	583,407	1875.....	1,414,124
1867.....	668,026	1876.....	1,250,531
1868.....	759,104	1877.....	1,363,345
1869.....	922,757	1878.....	1,310,838
1870.....	904,600	1879.....	1,576,807
1871.....	1,165,940	1880.....	1,750,000
1872.....	1,343,160	1881.....	1,925,000
1873.....	1,599,212		

All the above figures are *net* tons, and include the receipts of Bituminous coal by rail, and by canal. The receipts at Newburgh (18th ward,) are also here included. There is a growing trade in Anthracite coal, although the quantity has not yet reached the proportions of some western cities. Cleveland is a centre of manufactures upon a large scale, and the local consumption of Bituminous coal is put at 1,200,000 tons, in the last census year. In estimating the business done by the coal operators whose headquarters are at this point, the receipts and shipments at Ashtabula, Painesville and Lorain, should be included, for each of these places is but an additional coal shipping pier of the city of Cleveland.

During the year 1881, there was received at the city of Cleveland 114,706 *net* tons of Anthracite, and 3,351 tons thereof was shipped to other ports and places. Considerable business is done in the shipment of Bituminous coal to points reached by the vessels engaged in the iron ore trade, on their returning voyages. The custom house returns for last year show that the business to Canadian ports was 31,497 tons, and to American ports 828,110 tons, which includes 43,766 tons from Ashtabula and Lorain. There is no doubt but that the business of receiving and shipping coal at this city will grow with the output in the State of Ohio, as all the lines of railway within the State make for Lake Erie, as a point of vantage for the distribution of ore and coal, the twin main-springs of civilization. In position and facilities for carrying on this trade, there is no city located so favorably upon the lakes, as Cleveland.

The receipts for 1881, are divided as below:—

Bituminous coal by rail.....	1,478,383 tons.
Bituminous coal by canal.....	150,000 tons.
Bituminous coal at Newburgh (18th ward).....	300,000 tons.
	————— 1,928,383 tons.
Anthracite coal received.....	114,706 tons.

## Lake shipments of Bituminous coal.

	1877.	1878.	1879.	1880.	1881.
To ports in British Province.....	80,243	61,669	46,174	60,527	31,497
To domestic ports.....	549,920	597,412	580,610	654,953	828 110

## CENSUS REPORT OF COAL PRODUCTION OF THE UNITED STATES—YEARS ENDING MAY 31.

<i>States and Territories.</i>	1870. <i>Tons produced.</i>	1880. <i>Tons produced.</i>	<i>No. of Collieries.</i>	<i>Men Employed</i> <i>Miners.</i>	<i>Men Employed</i> <i>Laborers.</i>	<i>Capital</i> <i>Invested.</i>
Alabama.....	11,000	323,972	19	772	667	\$772,858
Arkansas.....	.....	14,778	14	tot. men.	130	15,600
California.....	.....	236,950	6	478	255	1,239,431
Colorado.....	.....	462,747	25	1,133	227	5,939,250
Georgia.....	.....	154,644	2	185	237	441,745
Illinois.....	2,624,163	6,115,377	590	12,233	3,204	10,654,261
Indiana.....	437,870	1,454,327	216	2,214	2,212	2,304,720
Iowa.....	263,487	1,461,116	227	3,797	958	2,778,937
Kansas.....	150,582	771,142	189	tot. men.	3,617	767,994
Kentucky.....	32,938	946,288	65	1,960	709	1,968,537
Maryland.....	2,345,153	2,228,917	32	2,797	805	13,165,557
Michigan.....	28,150	100,800	6	tot. men.	412	66,800
Missouri.....	621,930	556,304	144	tot. men.	2,599	389,315
Montana Territory.....	.....	224	1	3	.....	13,550
Nebraska.....	1,425	200	1	tot. men.	5	500
North Carolina.....	.....	350	1	1	2	40,170
Ohio.....	2,527,285	6,008,595	618	12,123	3,497	13,652,484
Oregon.....	.....	43,205	3	52	21	226,523
Pennsylvania Anthracite..	15,648,437	28,640,819	275	20,333	49,049	154,399,796
Pennsylvania Bituminous..	7,800,356	18,425,163	666	tot. men.	33,248	38,709,344
Rhode Island Anthracite...	14,000	6,176	1	13	18	27,500
Tennessee.....	133,418	495,131	20	680	368	1,708,968
Virginia Anthracite.....	.....	2,817	1	18	24	77,040
Virginia Bituminous.....	61,803	43,079	4	80	161	329,000
Washington Territory.....	.....	145,015	5	103	44	335,421
West Virginia.....	608,878	1,839,845	129	tot. men.	4,497	5,750,674
Wyoming Territory.....	.....	589,595	6	830	159	726,398
Total.....	33,310,905	71,067,576	3,266	49,805	107,225	256,502,373
Anthracite coal.....	15,662,437	28,649,812				
Bituminous coal.....	17,648,468	42,417,764				



## COAL IN TENNESSEE.

In this State the Appalachian coal field covers an area of 5,100 square miles, and includes within its limits the counties of Scott, Morgan, Cumberland, the greater parts of Fentress, VanBuren, Bledsoe, Grundy, Sequatchie and Marion, considerable parts of Claiborne, Campbell, Anderson, Rhea, Roane, Overton, Hamilton, Putnam, White and Franklin, and small portions of Warren and Coffee. The largest coal-mining operation in the State is the Tennessee Coal and Railroad Company at Tracy City; they are working the Sewanee seam. Next is the Southern States Coal and Iron Company at Victoria, working a seam said to be similar to that of Tracy City, but having a large quantity of sulphur in it. The coal is crushed and washed and then coked. The Knoxville Iron Company is also a large miner of coal. We give analyses of coals as found in Mr. J. B. Killebrew's report on the coal and iron of this State.

	Fixed Carbon.	Volatile.	Ash.	Sulphur.	Water.
Coal Creek, Anderson Company's mine.....	57.52	33.82	3.03	.20	1.04
Coal Creek, Empire mine.....	57.69	37.80	2.55	—	—
Sewanee, Tennessee Coal and Railroad Co.....	63.50	29.90	6.60	trace	—
Sewanee, Tennessee Coal and Railroad Co.....	63.00	29.30	6.60	trace	—
Etna, Kelly seam.....	74.20	21.39	2.70	.70	1.20
Emery mines, Walden's Ridge.....	63.10	27.70	7.70	.53	1.50
Sharp's, beyond Careyville.....	64.32	31.15	2.31	—	2.22
Sewanee Coke.....	63.36	—	15.44	.14	1.06

The production for 1880, was computed at 641,000 tons in our last annual, from good authority within the State, but Mr. Killebrew's figures will only foot up 589,420 tons, divided as follows: Coal Creek district 182,376 tons; Walden's Ridge, 124,000 tons; Sewanee Mountain district, 244,104 tons; Sequatchie Valley, 37,000 tons; scattering, 1,950 tons. There has been an increased business in 1881, and a few new openings have been made. Coke is now sold in St. Louis. We estimate the output for the year 1881, at 750,000 tons, as we have official figures of the Tennessee Coal and Railroad Company, showing sales of 162,998 tons coal and 82,557 tons, coke during the past year. Extensive developments of the coal areas in Tennessee are under way and it is likely that the output during 1882 will show largely increased figures. A seam found in White county recently is said to be similar to the Coal Creek coal in form and appearance, and shows by analysis 56% of fixed carbon; 42% of volatile matter, with traces of sulphur and ash, making up the remaining two per cent.

## COAL IN THE INDIAN TERRITORY.

At McAlester, I. T., the Osage Coal Mining Company are working a considerable tract of coal land, and the character of the coal and the coke made therefrom, may be judged of, from the following comparative analyses:

CONSTITUENTS.	M'ALESTER.		PITTSBURGH.	
	Coal.	Coke.	Coal.	Coke.
Moisture.....	2.10	0.325	3.15	0.490
Volatile matter.....	29.71	2.560	23.35	....
Fixed carbon.....	62.67	87.140	61.12	87.456
Ash.....	5.52	9.975	5.38	11.332
Phos. acid.....	....	....	....	0.029
Sulphur.....	....	....	2.10	0.693

## WYOMING AND UTAH.

The Union Pacific Railroad controls about all the coal mines and lines of transportation within the territories of Wyoming, Utah, Idaho, and Montana, while Nevada, and even California, have to depend largely upon that corporation for much of their coal. The company have extensive mines at Carbon, Rock Springs, and Almy, in Wyoming, and also at Coalville and other places, in Utah, which are reached by branch lines.

There is a marked increase in the consumption or demand for coal. A new demand has sprung up by the opening and extension of the Utah and Northern road through Idaho, and into Montana. The only coal vein as yet opened north of the U. P. main line, is that of some croppings near Shinebergers's, forty miles south of Dillon ; and it has not yet come into market.

The coal lands owned by the Union Pacific Railroad Company extend along the line of the road from Carbon to Echo, a distance of 335 miles, and embrace an area greater than the entire Anthracite region of Pennsylvania. Previous to 1875, the mines were worked by contractors ; but since that time, the company has operated them on its own account. The results of working the principal localities, and the total figures for the last six years, are shown in the following tables :

<i>Year.</i>	<i>Carbon.</i>	<i>Rock Springs.</i>	<i>Almy</i>	<i>Total Tons.</i>
1875.....	61,750	104,667	41,850	208,222
1876.....	69,062	134,953	60,756	264,771
1877.....	74,943	146,494	54,643	275,480
1878.....	62,418	154,281	59,096	275,795
1879.....	75,325	193,251	71,576	340,152
1880.....	100,424	244,460	100,235	445,129
Total production .....	443,322	978,106	388,111	1,809,549
Average cost per ton.....	\$1.42	\$1.21½	\$1.19	\$1.25¾

The sales of coal to individuals in the last five years have been ; in 1880, 137,119 tons at \$5.42 per ton ; in 1879, 125,662 at \$5.65 ; in 1878, 102,340¾ at \$6.13½ ; in 1877, 92,289¾ at \$6.26½ ; in 1876, 65,042 at \$6.51. From these figures it would appear that the railroad company is reaping exorbitant profits for the sales it makes.

## COAL IN COLORADO.

The output of coal continues to increase as the country is settled, and business enterprises are started on a solid footing. We put the output at 750,000 tons for last year, and this may be within the mark. While the coal interests in the northern part of the State have prospered, it is in the southern portion that the greatest strides have been made, for which the Colorado Coal and Iron Company must receive the credit. This corporation owns 15,000 acres of coal land, and 13,000 acres containing large deposits of iron ore. To develop these properties, the company has in operation coke ovens at El Moro and Crested Butte, a blast furnace at South Pueblo, with steel works nearly completed, and a rolling mill at Denver. The following table shows the total output of the Canon City, Walsenburg and El Moro coal mines.

<i>Mines.</i>	<i>1879.</i>	<i>1880.</i>	<i>1881.</i>
Canon City.....	78,000	107,575	120,000
Walsenburg.....	10,000	32,106	68,000
El Moro.....	21,000	81,697	140,000
Totals.....	109,000	221,378	328,000

From the El Moro mine there were shipped to the coke ovens 51,891 tons in 1880,

and 95,000 in 1881. The Trinidad mines produced about 40,000 tons during last year. In the Northern part of the State, the mines at Canfield and Northrup have been steady producers. Many new mines are being opened in that vicinity, which will furnish a vast amount of business for the railroads passing through those towns. These mines are on the extreme eastern edge of Boulder county. Towards the mountains, a few miles west of the Canfield mines, is the big mine at Louisville which supplies the Colorado Central and Union Pacific with coal. A few miles further west, but a short distance from the base of the mountains, are the Marshall mines, noted the State over for their productiveness. At this point are several mines, the most prominent connected by rail with Boulder. In this part of the State we notice the Fox Coal Mining Company, near Langford; the Northrup, Jackson, Star and Mitchell mines; there were about two hundred thousand tons produced around here last season.

Unquestionably the most important fact developed during the past year in connection with the coal development of the State, is the determination of the true Anthracite character of certain of the Gunnison coal fields. Near Irwin, nine miles west of Crested Butte, a vein of fine Anthracite coal, three feet four inches in thickness, covers a considerable area of country. The coal is a true Anthracite, hard, bright, and forming an excellent fuel; as the subjoined analysis testifies: Fixed carbon 93.93%; moisture 3.15%; ash 2.92%.

*Analyses of Colorado Bituminous Coals.*

	<i>State River.</i>	<i>Canon I.</i>	<i>Canon II.</i>	<i>Walsenburg.</i>	<i>Crested Butte.</i>
Water.....	1.50	4.50	6.15	3.23	0.44
Vol. matter.....	22.80	34.20	36.03	40.93	24.17
Fixed carbon.....	63.70	56.80	52.82	49.54	72.30
Ash.....	7.00	4.50	5.00	6.30	3.09

*Comparing with Pennsylvania Coal and Coke.*

<i>Coal.</i>	<i>Water.</i>	<i>Vol. Matter.</i>	<i>Fixed Carbon.</i>	<i>Ash.</i>	<i>Sulphur.</i>
El Moro .....	0.26	29.66	65.76	4.32	0.85
Connellsville .....	1.26	30.11	59.62	8.23	0.78
<i>Coke.</i>			<i>Fixed Carbon.</i>	<i>Ash.</i>	<i>Sulphur.</i>
El Moro .....			87.47	10.68	0.85
Connellsville.....			87.26	11.79	0.75

## COAL IN KENTUCKY.

The greater portion of Kentucky, excepting only those strips of territory contiguous to the Louisville and Nashville, Cincinnati Southern, and a few other roads which have been in operation for some time, is essentially an undeveloped wilderness, but one which contains, perhaps, greater possibilities than any other region of corresponding area in the United States. The State is divided naturally into three districts—the eastern or mountainous, the central or blue grass, and the western or Green river. The eastern district contains a coal field over 10,000 square miles in area, which, with the western field, gives the State a coal area of over 12,700 square miles, exceeding the area of the Pennsylvania coal fields, or the entire coal area of Great Britain and Ireland. This coal is mostly Bituminous, and is considered among the best known for manufacturing purposes. In addition to the Bituminous coal in the eastern district, there is also the largest area of Cannel coal in America. This coal is from three to four feet thick, and of superior quality. There was very little coal mining done in Kentucky

before the war. In 1870 the total amount mined was stated in the census report for that year, to be 150,580 tons, which, in 1875, was increased to 500,000 tons, and in 1881 to 1,104,281 tons. In the western field the most persistent and uniform coal of the series is D, or No. 9; it is from four to six feet thick, averaging five feet. It is an excellent coal for grate and furnace, and gives a good coke. A lot of slack from this vein, from St. Bernard mines, Earlington, Ky., washed and coked, gave a bright, firm coke, with only one per cent. sulphur. There is also coal sent out via the Kentucky and Cumberland rivers and the Ohio, from Boyd and Lawrence counties, besides local use. We credit the eastern coal field with 300,000 tons for 1881.

Details of the production of the western coal field are given below:—

	Tons 1879.	Tons 1880.	Tons 1881.
Mines on Henderson div. of Louisville and Nashville.....	157,150	192,047	283,281
Mines on Paducah and Elizabethtown Railroad.....	217,617	234,963	261,000
Mines on Green River.....	82,560	100,000	100,000
Mines on Ohio River, below Green River.....	79,600	82,000	80,000
Mines on Ohio River, above Green River.....	82,500	80,000	80,000
Grand Total.....	619,367	689,010	804,281

Of the coal carried by the P. & E. R. R. last year, the St. Bernard Coal Company produced 309,109 tons.

The Straight Creek Coal Company in Carter county is working the Coalton seam, five feet in thickness in the eastern coal field. In Pulaski county, a company is operating quite largely a seam of 46 to 48 inches of good coal. The Mt. Sterling and the Lexington Mining Companies are also developing land in Carter county. The railways are becoming large carriers of coal, and they are tending to greatly enlarge its distribution; this in turn tends to develop the coal resources of the State. In Greenup county are valuable coals for all purposes; a few sample analyses are appended.

Volatile matter.....	39.00	47.36	36.90	33.48
Fixed carbon.....	56.00	50.64	53.30	60.52
Moisture.....	5.10	2.00	4.80	6.00

The first and fourth are valuable for steam, and the second and third are good Cannel coals.

### COAL IN TEXAS.

As Texas has never yet had a geological survey, the extent of her coal strata is not well defined. It is supposed, however, to embrace about thirty thousand square miles, in the northern and western portions of the State. Over this great area coal has been found at a great many places, but at no place has it been mined except to a very small extent. It is a Bituminous coal, and almost, if not quite, precisely similar to the McAllister coal of the Indian Territory. Some Anthracite has also been discovered in this coal territory. The railroads are now penetrating the coal formations of Texas, and this great source of wealth will soon, doubtless, be rapidly developed. So far it is a virgin field. In addition to the true coals of Texas there is an immense bed of lignite which extends apparently across the entire State from northeast to southwest, in the eocene formation. It is said to be at some points twenty feet thick. This lignite much resembles canal coal, and doubtless would be made quite equal to it by a process of pressure by machinery. It is very fat in various oils and gases.



## PACIFIC COAST COALS.

The coal fields of the western coast of North America are limited in extent. Mr. W. A. Goodyear, formerly of the State Geological Survey, tells us that they are of comparatively recent geological origin. They are none of them of the carboniferous age, and, indeed, so far as yet known, none of them date back of the cretaceous period. The beds mostly furnish a non-caking Bituminous coal, which belongs to the class of lignites, or brown coal. Vancouver's Island, however, produces caking coal; and some caking coal of good quality has also been found in Washington Territory; but no workable mine of Anthracite has ever been discovered on this coast, and the little that has been found, has proved on investigation to have been the result of local and special metamorphism.

Of the two States and one Territory which border on the Pacific Ocean between Mexico and British Columbia, Washington Territory is by far the most liberally supplied with coal. Oregon comes next, and California last. In fact, California is decidedly unfortunate in the extent and character of her coal fields. For, although it is easy to find coal at many localities in the Coast range from one end to the other, as well as at certain points in the western foothills of the Sierra, yet it generally happens either that its quality is poor, or the quantity is small, or else that it is situated in the heart of the mountains, so far from market that the cost of transportation alone would far exceed the value of the coal.

The Mt. Diablo coal, which is mainly used for steam coal in San Francisco, and on the steamers of the bay, is of poor quality, and, owing to its sulphur, is disliked for domestic purposes.

The Coos Bay coal field covers several hundred miles of territory in Oregon, stretching from the Umpqua River, on the north, to points beyond the Coquille River, on the south, and extending back from the coast to from 15 to 20 miles interior. The country is covered with a heavy growth of timber. The coal to be mined at a profit must be of good quality, favorably situated for cheap mining, and very close to navigable waters.

The coal mines of Washington Territory are situated at Bellingham Bay, close to the British Columbia line, and in the vicinity of Seattle, on the eastern shore of Puget Sound. The Seattle coal field is one of the most important on the coast, and covers a large area. Some of the best coal on this coast comes from Vancouver's Island. The Wellington coal comes from there, and is considered a first-class coal.

We give below the shipments of Vancouver's Island coal. This island is located within the limits of the dominion of Canada. The coal area is estimated at 390 square miles. San Francisco receives a large percentage of the output.

Year.	Tons.	Year.	Tons.
1870.....	23,863	1876.....	140,087
1871.....	45,000	1877.....	154,052
1872.....	43,148	1878.....	190,640
1873....	45,723	1879.....	228,974
1874.....	81,397	1880.....	282,128
1875.....	110,145	1881.....	325,000

Tons are stated at 2,240 lbs.

In the report of the census, Washington Territory is credited with an output of 145,015 tons; this must be below the mark for something like 130,000 tons are shipped from Seattle to San Francisco. We append details of the shipments

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1871.....	4,918	1877.....	104,556
1872.....	14,830	1878.....	128,582
1873.....	13,572	1879.....	132,294
1874.....	9,027	1880.....	138,497
1875.....	70,157	1881.....	147,418
1876.....	112,734		

We find the following analyses of Coos Bay and Astoria coals compared with the Nanaimo and Bellingham Bay.

	<i>Astoria coals.</i>	<i>Coos Bay.</i>	<i>Nana- imo.</i>	<i>Belling- ham Bay.</i>
Water.....	2.56	20.00	2.98	8.39
Volatile matter.....	46.29	32.59	32.16	33.26
Fixed carbon.....	48.49	41.98	46.31	45.69
Ash.....	2.74	5.34	18.55	12.66

The Mt. Diablo coal is sold to the extent of 100,000 tons annually, in San Francisco.

We append details:—

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1871....	133,485	1877.....	96,172
1872.....	177,232	1878.....	122,034
1873.....	171,741	1879.....	134,435
1874.....	206,255	1880.....	158,723
1875.....	142,808	1881.....	103,055
1876.....	108,078		

The business from Seattle has just begun to increase rapidly and three steam colliers with a capacity, each, of 3,000 tons have been put in the trade, which has heretofore been done entirely by sailing vessels. The total tonnage produced was 160,000 tons at least; the shipments in the eleven years that the mines have been opened aggregate 876,558 tons. The mine which has produced more coal than any other, and whose monthly product and shipment is very much larger than any other, is the Newcastle, twenty miles southeast of Seattle, King county, W. T. It is the property of the Seattle Coal and Transportation Company, which in turn is the property of the Oregon Improvement Company, which is in its turn the property of Henry Villard and his associates. Twelve miles out from Seattle, on the railroad leading to Newcastle, is the Renton Mine, a much smaller affair than its big neighbor. The Renton was opened in 1869, and has been worked almost constantly ever since. Its shipments during the past year have been 15,450 tons.

The Talbot Mine, between Seattle and Renton, was opened in 1870 and petered out in 1877. The Old Bellingham Bay Mine, near the entrance to the sound, was opened in 1858, and after breaking half-a-dozen men and wrecking the fortunes of as many more petered out in 1876. Near Tacoma there are two large mines and several which are undeveloped. The only one in active operation is the Chandler Mine, recently sold to the Central Pacific Railroad Company. Its product is entirely taken by the proprietary railroad company.

The two companies at Newcastle and Renton, may reasonably be expected to place on board ship in 1882, 190,000 tons of coal. Other concerns have extensive coal interests in this county, and no less than four sections of railroad, tapping more or less veins, are said to be in early contemplation. Several more steam colliers are building, and it will not be surprising if the large exports predicted for 1882 are doubled in 1883.

## COAL MINING IN IOWA.

In preceding editions of this annual we gave the tonnage of the State of Iowa at figures that were thought to be above the mark. The census report for 1880 (year ending May 31) shows that there had been an output of 1,461,116 tons, fully confirming our figures. For the calendar years 1880 and 1881, there was a large increase over these figures. The able mine inspector, Mr. P. C. Wilson, gives an estimate of 3,500,000 tons for 1881, from 457 mines. Many of the operations are now upon a large scale, some operations having a capacity of 700 tons a day. Mining ranges from three and a half to five cents per bushel, according to the thickness of the seam worked. Seams included in this schedule are from four to seven feet in thickness. The inspector says: "I think in another year our mines, in regard to ventilation and general security will compare favorably with those of other States. Keokuk, MaLaska, Marion, Monroe, Wapello, Lucas, and Webster counties have coal ranging from five and a half to nine feet in thickness, whilst all the other coal producing counties, with the exception of the western portion of the State have coal from three to four feet in thickness. The western portion of the State referred to, includes Page, Taylor, Adams and Cass counties, in which is being worked the surface vein."

## ALABAMA COAL OUTPUT.

The census reports show that whereas 11,000 tons was the output in the census year ending in 1870, the quantity ten years later was 323,972 tons. The production is increasing rapidly of late years as the following schedule will show:

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1874.....	49,889	1878.....	194,268
1875.....	75,806	1879.....	290,000
1876.....	102,640	1880.....	340,000
1877.....	172,182	1881.....	400,000

By reference to a geological map of Alabama, it will be seen that the coal measures of the State are divided into three distinct fields, separated by long narrow valleys running northeast and southwest, in which the strata of formations older than the coal measures form the surface rocks. These three fields have been named by Prof. Tuomey, from the rivers that drain them, the Coosa, the Cahaba and the Warrior fields. The geological map will show also that the Warrior field itself is divided in several distinct parts by similar long and narrow valleys—Wills', Murphrees' and Brown's. The greater portion of the output comes from the mines on the line of the Selma and Dalton; the South and North; and the Alabama Great Southern Railroads; there is also a small tonnage by wagon delivery.

## COAL IN ILLINOIS.

Twenty-five counties of Illinois are now engaged in mining coal. The census report for the year ending with May 31, 1880, shows an output of 6,115,377 *net* tons of coal in this State. The total area of 32 counties embraced within the boundaries of the coal field is 18,864 square miles. If we deduct over one-half of this area for portions of the district where coal will never be found, because of the seams being washed out by the streams and rivers, or from the failure of the seam from any other cause, we shall have at least 9,000 square miles of a four-foot seam of coal. In every acre of land bearing a four-foot seam there are 5,000 tons of coal, or 3,205,000 tons to the square mile, or a total of 28,845,000.000 tons. In fact, as has been heretofore noticed there is plenty of coal within the State. It is widely distributed, and readily accessible. Although it is generally necessary to mine it by means of shafts, the coal is reached at so reasonable a depth from the surface that its mining is done without unusual expense; the railroads traversing the State furnish cheap transportation, and there is a ready market for all the State furnish cheap transportation, and there is a ready market for all the coal that is produced. As compared with the coal produced in the Allegheny coal field of Pennsylvania, the quality of the Illinois coal is reported as inferior. Chicago receives a large proportion of its supply of Bituminous coal from the Wilmington district, and it is of good quality, as will be seen from the analyses appended. The coal association in this district is very powerful, and last seasons output 961,060 tons. The analyses are:—

Fixed carbon.....	47.405	47.939
Volatile matter.....	39.642	39.761
Water.....	6.981	7.013
Ash.....	5.972	5.287

St. Louis, Mo., obtains a large supply of Bituminous coal from the Belleville district, in St. Clair county, Illinois. This county shows a very large coal area, and the output last year was 1,500,000 tons. The coal seam is seven feet in thickness and analyses 55.2 fixed carbon, and 33.8 volatile matter. There are some very large mining concerns in this district, the most prominent, being the Carbondale Coal and Coke Company. A large business was done in making coke last year, fully two hundred thousand tons having been received at St. Louis. Peoria county, in the last census year is reported as having turned out 443,268 tons of coal. The Streator coal field is also an important district, and the output last year was 802,702 tons. During the year 1881 there were 1,400,132 tons of Illinois and Indiana coal received in the City of Chicago, and of this quantity, there were, from the Wilmington coal field, 739,087 tons; Morris, 14,336; Minonk, 45,581; Streator, 80,301; total, 879,305 tons. Of the Indiana coal, 245,250 tons were from the Fountain county coal field, and 275,577 tons from the Indiana block coal district.

The coal production within the State of Indiana continues to grow, and the estimate of a million and a half tons as the output for the year 1881, is within the mark, by the last census there were 216 coal mines in Indiana, giving employment to 4,423 men, with a production estimated at 1,454,327 tons.



## COAL TRADE OF OHIO.

The census report for the year ending May 31, 1880, shows an output of coal within this State, of 6,008,595 tons. Mr. Andrew Roy, the inspector of mines, states that owing to the opening up of several new mining districts in the State, after the date of the census reports, the output for the year ending December 31, 1880, could not have been less than 7,000,000 tons. According to the best estimates the annual production for the year ending December 31, 1881, will reach 8,250,000 tons. During the year the mines were comparatively free from strikes, suspensions and lock-outs. The coal production of the State, according to the most reliable information obtainable, for the year 1872 to the year 1881, inclusive, was as follows ;

Year.	Tons.	Year.	Tons.
1872.....	5,315,294	1877.....	5,250,000
1873.....	5,450,028	1878.....	5,500,000
1874.....	3,267,585	1879.....	6,000,000
1875.....	4,864,259	1880.....	7,000,000
1876.....	3,500,000	1881.....	8,250,000

The coals of Ohio are all of the Bituminous variety, and are known by various and general names, as Block coal, Gas coal, Cannel coal, etc., and by many special names, as Mahoning Valley coal, Hocking Valley coal, Salinesville coal, etc., according to the localities from which they are drawn. The best furnace coal is the Block coal of the Mahoning Valley ; the best coke is made from the coals at Leetonia and Washingtonville, in Columbia county ; the best house coal is found in Jackson county ; the best gas coal, so far as recent tests would seem to indicate, is the Barnesville coal, of Belmont county. A few analyses are appended :—

	Massillon.	Coshocton.	Hocking Valley.
Specific Gravity.....	1.247	1.296	1.287
Water.....	.695	.360	.580
Volatile matter.....	32.38	36.10	35.42
Fixed Carbon.....	57.49	58.00	51.15
Ash.....	3.18	2.20	7.63

The Hocking Valley furnishes a large portion of the coal produced, and we have it upon the best authority, that including the Sunday Creek district, there were two million and a half tons mined last year. The Columbus and Hocking Valley R. R. did a business of a million and a half tons. Mahoning Valley turned out a million and a half tons. The State of Ohio is now the second on the list of coal producers, and the outlook is good for maintaining this position.

## GREAT FLAT TOP COAL FIELD, WEST VIRGINIA.

The purchase of the New River Railroad by the Norfolk and Western Railroad Company, and the announcement, that that railway will be completed to the Great Flat-Top Mountain coal-field on the Bluestone River side of it, in Mercer county, W. Va., and Tazewell county, Va., makes the following analyses of samples from three beds of these coals, made by Messrs. Booth, Garrett and Blair, of interest and value.

	No. 1.	No. 2.	No. 3.
Moisture.....	1.255	1.0-0	0.850
Volatile.....	20.175	18.630	20.639
Fixed carbon.....	77.675	72.179	72.750
Ash.....	0.845	8.120	6.770
Coke, per cent.....	78.570	80.290	78.520

## GREAT BRITAIN.

The quantity of coal produced in Great Britain,\* is stated by the keeper of the mineral statistics to be 146,818,622 tons for the year 1880. The returns for the year 1881 will not come in until about August of this year. Production has grown fully sixty per cent. in twenty years. The total in 1860 was 83,200,000 tons, with an export trade of 7,400,000 tons. The total exports of coal during 1881 (including coal for steamers engaged in the foreign trade 5,227,583 tons) were 24,819,186 tons, or rather more than the amount of Anthracite coal marketed in the United States, during the same period of time. We append a few details of the coal production.

Year.	Tons.	Year.	Tons.
1870....	112,875,725	1876....	133,344,766
1871....	117,352,028	1877....	134,610,763
1872....	123,386,750	1878....	132,607,866
1873....	127,012,767	1879....	134,003,288
1874....	125,043,257	1880....	146,818,622
1875....	131,867,105	1881....	154,000,000

The total value of minerals and metals obtained from the mines of the United Kingdom in the year 1880, appear in the annexed summary, the returns of the two previous years being given for comparison :—

	1880.	1879.	1878.
Metals.....	£21,582,501	£16,835,623	£18,283,124
Coal.....	62,395,414	46,902,879	46,412,753
Minerals.....	3,539,635	2,333,769	2,643,404
Total.....	£ 7,517,550	£66,072,271	£67,339,281

The distribution of the coal mined, is estimated as having been partly as below:—

In Iron and Steel making.....	33,500,000 tons.	Gas Works.....	7,000,000 tons.
Domestic consumption.....	35,000,000 tons.	Locomotive use.....	3,000,000 tons.
Exported.....	20,000,000 tons.	Textile industries.....	15,000,000 tons.
Glass Works, Potteries, etc.....	12,500,000 tons.	Steamships.....	10,000,000 tons.
Used at collieries.....	7,000,000 tons.	Engineering Works.....	5,000,000 tons.

There were 3,870 collieries, employing 470,000 persons in the year 1880. Prices at the pits averaged about eight shillings a ton.

The receipts of coal at London, for a series of years, have been as below :—

Year.	By Sea.	By Canal.	By Rail.	Total.
1871.....	2,762,712	6,615	4,449,141	7,218,468
1872.....	3,548,918	8,236	4,999,268	7,556,422
1873.....	2,665,630	11,195	5,147,413	7,824,238
1874.....	2,727,719	5,982	4,689,785	7,423,486
1875.....	3,134,846	4,594	5,065,452	8,201,892
1876.....	3,273,443	4,695	5,173,237	8,451,375
1877.....	3,170,601	4,608	5,426,204	8,591,413
1878.....	3,198,309	2,977	5,593,290	8,794,576
1879.....	3,508,526	2,910	6,447,395	10,058,811
1880.....	3,714,708	508	6,200,272	9,915,488

Of the receipts in 1880, some 2,447,344 tons were afterward conveyed beyond the limits, leaving 7,468,144 tons as consumed in the city.

The exportations of coal from Great Britain have been as below :—

Year.	Tons.	Year.	Tons.
1871.....	12,851,957	1877.....	15,420,050
1872.....	13,211,961	1878.....	15,483,816
1873.....	12,712,222	1879.....	16,435,642
1874.....	13,927,205	1880.....	18,702,551
1875.....	14,475,036	1881.....	19,591,598
1876.....	16,299,077		

## COAL IN AUSTRIA.

In this country coal mining dates back to the year 1550. In 1819, it had amounted to 94,607 tons; in 1825, to 154,944 tons; in 1830, to 211,298 tons; in 1835, to 250,782 tons; in 1840, to 479,212 tons; in 1845, to 721,707 tons; in 1850, 944,323 tons; in 1855, 2,101,050 tons; in 1860, 3,496,495 tons; in 1865, 5,069,303 tons. The Lignite and Coal are separated and the following table shows the progress of the industry.

<i>Yearly product in metric tons.</i>	<i>Coal.</i>	<i>Lignite.</i>	<i>Total.</i>
1850.....	4,295,775	4,000,169	8,355,944
1871.....	4,969,980	5,078,058	10,048,038
1872.....	4,788,455	5,767,612	10,556,067
1873.....	5,171,189	6,732,884	11,904,073
1874.....	5,096,659	7,183,098	12,279,757
1875.....	5,185,234	7,666,812	12,852,046
1876.....	5,564,331	7,798,255	13,362,586
1877.....	5,480,311	8,771,727	14,252,038
1878*	5,078,219	7,241,103	12,319,322
1879*	5,378,605	7,905,935	13,284,540
1880*	6,000,000	8,000,000	14,000,000

Upwards of 1,500,000 tons of Prussian coal are received, and 2,750,000 tons of coal are exported, mainly to Germany.

## THE COAL PRODUCTION OF THE WORLD.

We have tabulated the following schedule, from the best sources, and the figures may be taken as essentially correct:—

<i>Countries.</i>	<i>Square miles. of Coal Area.</i>	<i>Tons 1870.</i>	<i>Tons 1878.</i>	<i>Tons 1879.</i>	<i>Tons 1880.</i>
Great Britain.....	11,900	110,431,192	132,607,856	134,003,288	146,818,620
United States.....	192,000	32,863,690	49,130,584	59,803,398	69,200,934
Germany.....	1,770	34,003,004	43,841,533	46,953,002	50,000,000
France.....	2,086	13,179,708	16,960,416	17,110,979	19,412,112
Belgium.....	510	13,697,118	14,899,175	15,446,512	16,887,047
Austria.....	1,800	8,355,944	14,500,000	15,447,292	16,500,000
Russia.....	30,000	829,745	2,475,390	2,864,534	3,000,000
Spain.....	3,501	661,927	765,000	775,000	800,000
Nova Scotia.....	18,000	625,769	770,603	788,271	1,032,710
Australia.....	24,840	868,564	1,575,926	1,750,000	2,000,000
India.....	2,004	500,000	4,000,000	4,000,000	4,000,000
Japan.....	5,000	.....	600,000	750,000	8,800,000
Vancouver's Island.....	300	29,863	190,640	228,974	282,128
Chili, 50,000; Sweden, 90,000; Italy, 220,000; China, 4,000,000.....					4,360,000

## COAL IN NEW SOUTH WALES.

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1829.....	780	1873.....	1,002,862
1839.....	21,283	1874.....	1,261,351
1849.....	48,516	1875.....	1,253,475
1859.....	304,213	1876.....	1,319,518
1869.....	919,774	1877.....	1,444,171
1870.....	868,564	1878.....	1,575,926
1871.....	898,784	1879.....	1,750,000
1872.....	1,012,426	1880.....	2,000,000

\*Does not include output in Hungary. The total for 1879, is stated to have been 15,447,292 tons. Later official details have not been received.

## COAL IN THE GERMAN EMPIRE.

This country, as now consolidated, is one of the largest producers of coal in Europe. Since 1870, the Empire includes old Prussia, Saxony, Bavaria, and the States of the Zollverien. The grand total of the output in 1871, when the consolidation of the Empire was completed, was 37,852,464 tons of 2,240 lbs. Of the quantity now sent out of the pits, Prussia is to be credited with 89%.

## OUTPUT OF COAL IN THE EMPIRE, AS NOW CONSTITUTED.

Year.	Tons.	Year.	Tons.
1843.....	4,333,535	1873.....	36,392,280
1857.....	11,279,266	1874.....	35,918,614
1867.....	23,808,071	1875.....	37,436,368
1868.....	25,704,758	1876.....	38,454,428
1869.....	26,774,368	1877.....	33,672,025
1870.....	26,397,770	1878.....	35,500,167
1871.....	29,373,272	1879.....	37,674,648
1872.....	33,306,418	1880.....	40,000,000

## OUTPUT OF LIGNITE IN THE EMPIRE AS NOW CONSTITUTED.

Year.	Tons.	Year.	Tons.
1848.....	1,417,420	1873.....	9,752,914
1857.....	3,587,855	1874.....	10,739,632
1867.....	6,994,818	1875.....	10,367,686
1868.....	7,174,365	1876.....	11,096,034
1869.....	7,569,545	1877.....	8,636,597
1870.....	7,605,234	1878.....	8,341,366
1871.....	8,482,838	1879.....	9,278,354
1872.....	9,018,048	1880.....	10,000,000

## COAL IN RUSSIA.

French capital is engaging very largely in developing the mineral resources of this country. Official reports of the coal output as prepared by the department of mines, are as below:—

Year.	Tons.	Year.	Tons.
1867.....	437,625	1875.....	1,677,019
1871.....	829,745	1876.....	1,788,779
1872.....	1,097,864	1877.....	1,769,783
1873.....	1,170,979	1878.....	2,475,390
1874.....	1,266,637	1879.....	2,864,534

Metric tons, 2,204 lbs.

This includes coal, and Brown coal, and Anthracite (477,972 tons in 1879.) No coal is exported, but the imports reach up to 1,800,000 tons; the English furnishing three-fifths of this quantity, the remainder being from Germany. Most of the Russian coal supply comes from the Donetz district, and the amount mined in 1881, was estimated at about 3,000,000 tons of Bituminous and 600,000 tons of Anthracite coal. The latter was discovered on the coast of Lake Onega, and after some time spent in experiments, the Russian government undertook the working of the mines. Patent fuel is made up into briquets of two classes, one of which consists of 7% of bitumen, 25% of coal and 63% of Anthracite; the second is composed of almost equal parts of peat and Anthracite, with a small amount of bitumen. The price of the former quality in St. Petersburg varies from 17s. to 22s. per ton. The Russian Technical Society, in reporting on this Anthracite formation, states that the deposit lies 36 yards below the surface and is 11 feet in thickness; below this there are three other seams of almost the same thickness.



## COAL IN BELGIUM.

The process of the extraction of coal has been as below, in metric tons of 2,204 lbs.

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1830.....	2,345,797	1870.....	13,697,118
1835.....	2,557,097	1871.....	13,733,176
1840.....	3,929,962	1872.....	15,658,948
1845.....	4,919,156	1873.....	15,778,401
1850.....	5,820,884	1874.....	14,669,029
1855.....	8,409,330	1875.....	15,011,331
1860.....	9,609,895	1876.....	14,329,578
1865.....	11,840,703	1877.....	13,938,523
1866.....	12,774,662	1878.....	14,899,175
1867.....	12,755,822	1879.....	15,446,512
1868.....	12,298,589	1880.....	16,887,047
1869.....	12,943,994		

Notwithstanding the increase in the output in 1880, the imports of coal from England and Germany are stated to have considerably augmented. The imports were 915,628 tons, although on the other hand, there were exported 4,493,145 tons. The province of Hainault furnished 75 per cent. of the total supply, the remainder being drawn from Liege and Namur.

As regards the coal imported into Belgium in the first eleven months of last year, (1881) it may be added that Prussia contributed 331,571 tons; the Low Countries, 225,255 tons; England, 228,990 tons; France, 123,342 tons; and other countries, 191 tons.

## COAL IN FRANCE.

Statistics of the output are given below, in metric tons of 2,204 lbs.

<i>Year.</i>	<i>Tons.</i>	<i>Year.</i>	<i>Tons.</i>
1787.....	215,000	1871.....	13,240,135
1802.....	844,180	1872.....	16,100,773
1811.....	773,694	1873.....	17,485,786
1820.....	1,093,658	1874.....	17,059,547
1830.....	1,862,665	1875.....	16,949,032
1840.....	3,103,382	1876.....	17,104,794
1850.....	4,433,517	1877.....	16,877,200
1860.....	8,309,622	1878.....	16,960,416
1865.....	11,652,755	1879.....	17,110,979
1870.....	13,179,708	1880.....	19,412,112

In 1850, France produced 4,433,567 tons of coal, of which total the Nord and Pas-de-Calais furnished 1,000,677 tons. In 1880 the total output of France had risen to 19,412,112 tons, in which the two departments shared with 8,493,904 tons. The coal consumption of France, which has always exceeded home production, rose from 7,225,267 tons in 1850 to 28,047,136 tons in 1880, thus showing an increase during the thirty years of 288 per cent. The difference, therefore, between home production and home consumption grew from 2,791,700 tons in 1850 to 8,635,014 tons in 1880. Of this excess, Belgium contributed in 1880 no less than 4,157,010 tons, while England comes next with 3,291,155 tons, and Germany with 982,332 tons.

## IMPORTS AND EXPORTS OF COAL.

The tariff from 1824 to 1843, was six cents per bushel, or \$1.68 per ton; from 1843 to 1846, \$1.75 per ton; 1846, 30% ad valorem; 1847 to 1861, 24% ad valorem; 1862-3-4, \$1.00 per ton; 1865, \$1.10; 1866 to 1872, \$1.25 per ton; since August, 1872, 75 cents per ton. During the period from June, 1854, to March 1866, the Reciprocity treaty was in force, and coal from the British possessions in North America, was admitted into the United States, duty free. The imports are from Australia and British Columbia to San Francisco; from Great Britain to the Atlantic and Pacific coasts; from Nova Scotia to Atlantic coast ports. Exports are mainly from the Lake and Atlantic shipping ports to the Canadian Provinces, and to the West Indies.

The imports and exports for the calendar years named, have been as below:—

	1876.	1877.	1878.	1879.	1880.
IMPORTS, Bituminous.....	488,132	498,275	566,938	449,167	577,458
EXPORTS, Anthracite.....	362,044	377,979	312,273	421,992	411,706
Bituminous.....	253,387	324,839	345,347	221,371	198,413

Detailed statement of the imports and exports for year ending June 30, 1881.

	IMPORTS.	EXPORTS.	
		Anthracite.	Bituminous.
Argentine Republic.....	8	.....	.....
Belgium.....	50	.....	.....
Brazil.....	100	1,654	250
Central American States.....	.....	83	52
Chili.....	.....	2,127	.....
China.....	.....	3,756	.....
Denmark.....	30	.....	.....
Danish West Indies.....	.....	3,847	5,397
France.....	49	30	320
French West Indies.....	30	1,464	620
Miquelon, Langley, and St. Pierre Islands.....	.....	198	.....
French Poss. in Africa and adjacent islands.....	9	.....	.....
Germany.....	519	.....	200
Great Britain.....	247,308	471	4,552
Gibraltar.....	55	.....	.....
Nova Scotia and New Brunswick.....	131,647	48,861	1,297
Quebec, Ontario, Manitoba, and N. W. Ter.....	983	362,447	103,057
British Columbia.....	207,432	17	55
Newfoundland and Labrador.....	.....	1,949	.....
British West Indies.....	58	1,268	491
British Possessions in Australasia.....	88,757	.....	.....
Hawaiian Islands.....	.....	1,987	775
Hayti.....	.....	232	.....
Italy.....	50	130	.....
Japan.....	.....	280	.....
Mexico.....	.....	1,926	1,396
Dutch West Indies.....	.....	.....	500
Peru.....	20	.....	.....
Azore, Madeira, and Cape Verde Islands.....	12	12	.....
San Domingo.....	.....	1,205	.....
Spain.....	80	.....	.....
Cuba.....	19	24,853	63,243
Porto Rico.....	.....	166	.....
United States of Columbia.....	3	961	6,125
Venezuela.....	.....	606	586
All other islands and ports, &c. &c.....	138	1,675	112
Total.....	677,360	462,208	191,038

## NOVA SCOTIA.

The Inspector of Mines, EDWIN GILPIN, furnishes the following summary of the coal sales of Nova Scotia, since the beginning of the industry in that province.

Year.	Tons.	Year.	Tons.
1785—1790.....	14,348	1872.....	786,914
1791—1800.....	51,048	1873.....	881,106
1801—1810.....	70,452	1874.....	749,127
1811—1820.....	91,527	1875.....	706,795
1821—1830.....	110,820	1876.....	634,207
1831—1840.....	839,981	1877.....	687,065
1841—1850.....	1,533,798	1878.....	693,511
1851—1860.....	2,998,829	1879.....	688,624
1861—1870.....	4,927,339	1880.....	954,659
Total to 1871.....	10,069,143	1881.....	1,035,014
1871.....	596,418		

The duty on the coal imported into the United States from Nova Scotia is seventy-five cents per ton, gold, on the round or coarse coal, and forty cents per ton, on the culm or slack; that is the coal which passes through bars not wider than three-quarters of an inch. About ten per cent. of the coal sold is culm. We give below the duty at various dates :—

1846 to 1862.....	24 per cent. ad valorem.
1862-3-4.....	\$1.00 per ton.
1865.....	1.10 per ton.
1866-1872.....	1.25 per ton.
1872 to date.....	.75 per ton.

Reciprocity Treaty in force from June, 1854, to March, 1866.

Number of tons actually raised during a term of years :—

Year.	Tons.	Year.	Tons.
1865.....	715,786	1874.....	872,720
1866.....	664,998	1875.....	781,165
1867.....	517,525	1876.....	709,646
1868.....	462,188	1877.....	757,496
1869.....	578,062	1878.....	770,603
1870.....	625,769	1879.....	788,271
1871.....	673,242	1880.....	1,032,710
1872.....	880,950	1881.....	1,124,270
1873.....	1,051,467		

The destination of the coal sold during the year 1881, together with a comparison of the "markets" is shown below :—

Markets.	1881—Tons.	1880—Tons.	1879—Tons.	1878—Tons.	1877—Tons.
Nova Scotia.....	382,343	352,913	278,120	279,172	255,790
Quebec.....	268,628	739,091	154,118	83,710	95,118
New Brunswick.....	123,526	97,817	84,731	115,245	104,818
Newfoundland.....	62,174	60,626	57,651	61,361	49,342
P. E. Island.....	49,813	46,767	44,891	43,412	45,169
United States.....	113,728	123,423	51,641	88,495	118,216
West Indies.....	21,620	12,165	10,124	16,999	13,660
South America.....	761	.....	.....	523	573
Europe.....	13,051	12,857	7,343	3,594	4,379
Total.....	1,035,014	954,659	688,624	693,511	637,065

## FOREIGN COAL TRADE NOTES.

IN SWEDEN, the total output of coal is not over 90,000 tons annually, but there is imported from Great Britain, something over a million tons annually; the figures for 1881 being 1,395,372 tons.

IN CHILI the coal is of a lignitic character, and amounts to a yearly business of 400,000 tons, of which 50,000 tons are exported. In addition to the home supply 150,000 tons are imported from Great Britain annually.

SPAIN is reported to consume 1,750,000 tons of coal; the output is 750,000 tons, and 35,000 tons lignite, while the imports average 1,000,000 tons; the exports during 1881 from Great Britain amounted to 1,002,080 tons.

IN SWITZERLAND, in the Valais, is found Anthracite coal with the following component parts by analysis: Carbon 88.16; hydrogen, 2.15; oxygen and nitrogen, 1.34; Ash, 8.35. The quantity of coal used in the country, is 500,000 tons annually, and it is all imported.

IN CHINA, some coal mines opened near Peking are likely to prove a perfect success. Capital to work the mines has been raised by the natives, no foreigner being allowed to subscribe. The mines are expected to be in full working order by the middle of this year, and a broad canal will convey the coals up to Lu-t'ai, from which place the Chinese intend to ship them to sea, after having dredged the Lu-t'ai river.

IN INDIA the amount of coal raised varies a good deal from year to year with a supply of sea-borne coal in the market, the latter depending very much on the amount of tonnage available. The supply of coals which had been imported from Australia to India during the last twenty years has nearly dwindled to nothing. The consumption in British India per annum in locomotives and factories is stated by one authority as being at present 1,000,000 tons, of which one-half was raised from Indian mines, the remainder coming from England, France and Australia. Other authorities give four millions as the production of native coal. There was shipped from Great Britain in 1881, 1,071,173 tons of coal destined for British India.

ITALY produces perhaps 125,000 tons of lignite, and 95,000 tons of peat annually; beside this there is imported from Great Britain a million and half tons of coal; the figures for 1881, were 1,725,956 tons. The coal mines at Murlo, the property of the French company of the mines of Pienza, are progressing favorably. The yield of coal has increased from 2,000 tons in 1876 to 10,000 in 1880. The strata vary greatly in thickness. The coal is of a dull black color, and when recently excavated contained about 15 per cent. of water. The dust is of a chocolate brown color. The coal contains no pyrites, and therefore, leaves white ashes without forming the crust which impedes combustion. The quantity of ash is from 9 to 12 per cent. The society intends to make the coal into coke, which will provide a first-rate and economical combustible for agricultural machines and other purposes.



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AT HOME AND ABROAD,

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Corrected to the Latest Dates.

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BY FREDERICK E. SAWARD,

Editor of "THE COAL TRADE JOURNAL."

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# THE COAL TRADE.

## INTRODUCTION.

We present the Tenth Annual Review of the Coal Trade, at home and abroad. The past year has been one of continued prosperity; as the beat of the artery tells the state of the body, so the increased output of coal may be taken as an indication of the prosperity of the country in which it is produced. Prices were higher in 1882, than for several years, and yet the cost to the consumer, as compared with many other articles of trade, was low. The output of coal in the United States is increasing; the following figures based upon careful reports will serve to show the relative position of the several States :

	Tons, 1881.	Tons, 1882.
Pennsylvania Anthracite.....	28,500,016	29,120,096
Pennsylvania Bituminous.....	20,000,000	22,000,000
Illinois.....	6,000,000	9,000,000
Ohio.....	8,250,000	9,450,000
Maryland.....	2,261,918	1,582,518
Missouri.....	1,750,000	2,000,000
West Virginia.....	1,500,000	2,000,000
Indiana.....	1,500,000	2,000,000
Iowa.....	1,750,000	3,500,000
Kentucky.....	1,100,000	1,300,000
Tennessee.....	750,000	850,000
Virginia.....	400,000	100,000
Kansas.....	750,000	750,000
Michigan.....	100,000	100,000
Rhode Island.....	10,000	10,000
Alabama.....	375,000	800,000
Washington.....	175,000	225,000
Wyoming.....	275,000	650,000
Utah.....	225,000	250,000
Colorado.....	700,000	1,000,000
Georgia.....	150,000	175,000
Total.....	76,221,934	86,862,614

Coal is a civilizing power, and as we have before stated in these annual reports, the Anglo-Saxon race represent the most advanced civilization, and they are at the same time the largest coal producers, as a glance at the statistics in this volume will show.

## ANTHRACITE COAL.

We present in this edition the facts and figures bearing upon the Anthracite coal trade to the end of the calendar year 1882. There was an increase in the output of nearly one million tons, as the following tabular statement will show:

	Tons 1879.	Tons 1880.	Tons 1881.	Tons 1882.
January.....	1,441,751	1,764,316	1,672,645	1,833,910
February.....	1,578,246	1,296,570	2,118,174	1,605,243
March.....	1,936,912	1,746,872	2,225,842	2,108,042
April.....	2,071,270	2,016,640	1,945,855	2,135,802
May.....	2,397,589	1,651,080	2,086,742	2,256,097
June.....	2,462,218	1,836,640	2,418,239	2,625,039
July.....	2,403,893	1,636,795	2,572,099	2,757,248
August.....	2,331,405	1,895,516	2,733,548	2,894,702
September.....	2,417,581	2,842,478	2,588,219	2,558,443
October.....	2,641,751	2,378,810	2,686,053	2,945,037
November.....	2,385,665	2,492,664	2,727,872	2,797,372
December.....	2,074,404	1,878,858	2,724,726	2,599,439
Totals.....	26,142,689	23,437,242	28,500,016	29,120,096

Of the output in 1882, 47.98 per cent. was from the Wyoming region, 19.54 per cent. was from the Lehigh region, and 32.48 per cent. was from the Schuylkill region; the gain as compared with 1881 was pretty evenly divided. The shipments to competitive points were less during 1882 (12,018,764 tons) than in 1881, when the quantity to tide was 12,169,030 tons. This shows that the interior trade took 770,000 tons more last year than they did the preceding year. In our preceding yearly reports we called attention to the growing trade in Anthracite coal at points west and north of the State wherein it is produced, and the fact is yearly being developed that the quantity of Anthracite coal called for to supply this western trade will make the price of coal at tide. All the reports that we have from the direction named—west and north—show that the coal will be taken in increasing quantities each year. The new lines of railway leading from the Anthracite regions are all tending in that direction, and every effort is being made by the several parties in interest to promote trade with the vast territory which is now so rapidly being filled up with a population which of necessity requires fuel to maintain its industrial and domestic economy. By many well-informed operators it is not considered at all probable that the yearly capacity is above thirty millions of tons per year. There were only forty-eight idle days at the Anthracite mines during last year. Labor in the several regions is largely paid on the basis of the selling price of the coal in market, therefore there is no complaint when these stoppages are ordered.

Regarding the suspensions of mining at the Anthracite collieries during the year 1882, we find that they numbered in all forty-eight days. In the several months they were:—

January 19, 20, 21—26, 27, 28. February 9, 10, 11—16, 17, 18—23, 24, 25. March 9, 10, 11—16, 17, 18—23, 24, 25. April 6, 7, 8—27, 28, 29. May 4, 5, 6—11, 12, 13—25, 26, 27. June 1, 2, 3. August 31. September 1, 2—7, 8, 9.

THE PRODUCTION OF ANTHRACITE COAL.

The shipment of Anthracite as reported by J. H. Jones, accountant of the Anthracite coal statistics, was as stated below. Coal used in and about the mines not included in these statements; the amount will average eight per cent. of the shipments.

Year.	Schuylkill.	Lehigh.	Wyoming.	Total.
1862. . . . .	3,372,583	1,351,054	3,145,770	7,869,407
1863. . . . .	3,911,683	1,894,713	3,759,610	9,566,006
1864. . . . .	4,161,970	2,054,669	3,960,836	10,177,475
1865. . . . .	4,356,959	2,040,913	3,254,519	9,652,391
1866. . . . .	5,787,902	2,179,364	4,736,616	12,703,882
1867. . . . .	5,161,671	2,502,054	5,325,000	12,988,725
1868. . . . .	5,330,737	2,502,582	5,968,146	13,801,465
1869. . . . .	5,775,138	1,949,675	6,141,360	13,866,180
1870. . . . .	4,968,157	3,239,374	7,974,660	16,182,191
1871. . . . .	6,552,772	2,235,707	6,911,242	15,699,721
1872. . . . .	6,694,890	3,873,339	9,101,549	19,669,778
1873. . . . .	7,212,601	3,705,596	10,309,755	21,227,952
1874. . . . .	6,866,877	2,773,836	9,504,408	20,145,121
1875. . . . .	6,281,712	2,834,605	10,596,155	19,712,472
1876. . . . .	6,221,934	3,854,919	8,424,158	18,501,011
1877. . . . .	8,195,042	4,332,760	8,300,377	20,828,179
1878. . . . .	6,282,226	3,237,449	8,085,587	17,605,262
1879. . . . .	8,960,329	4,595,567	12,586,293	26,142,689
1880. . . . .	7,554,742	4,463,221	11,419,279	23,437,242
1881. . . . .	9,253,958	5,294,676	13,951,383	28,500,016
1882. . . . .	9,459,288	5,689,437	13,971,371	29,120,096

DIVISION OF SHIPMENTS 1881-1882.

Interest.	Tons, 1881.	Tons, 1882.
Philadelphia and Reading Railroad. . . . .	6,940,383	7,000,113
Lehigh Valley Railroad. . . . .	5,721,869	5,933,719
Central Railroad of New Jersey. . . . .	4,085,423	4,211,052
Delaware, Lackawanna and Western Railroad. . . . .	4,388,969	4,638,717
Delaware and Hudson Canal Company. . . . .	3,211,406	3,203,168
Pennsylvania Railroad Company. . . . .	2,211,363	2,332,974
Pennsylvania Coal Company. . . . .	1,475,380	1,469,821
New York, Lake Erie and Western Railroad. . . . .	465,230	330,510
Totals. . . . .	28,500,016	29,120,096

The Pennsylvania Railroad interest includes Shamokin coal, Lykens Valley coal, and some Wyoming coal. Reading is of the various grades of Schuylkill. Lehigh Valley is three-fourths Lehigh, and balance Wyoming. Central Railroad of New Jersey is about equally divided between Lehigh and Wyoming. Delaware and Hudson; Delaware, Lackawanna and Western Company; Pennsylvania Coal Company, all from Wyoming region. 'Erie' coal is from Wyoming. In addition to this may be put 90,000 tons of Loyalsock Anthracite from Sullivan county. Details of the business of the various companies will be found on the following pages:



## THE LEHIGH VALLEY RAILROAD COMPANY.

We give below the details of the tonnage of this road for the fiscal years ending November 30th:

Received from.	Tons, 1879.	Tons, 1880.	Tons, 1881,	Tons, 1882.
Wyoming region.....	1,135,587	1,162,706	1,362,706	1,322,712
Hazleton region .....	1,964,278	2,125,104	2,674,077	2,919,219
Beaver Meadow region....	474,761	441,591	502,631	538,129
Mahanoy region. ....	786,082	876,860	1,257,933	1,477,069
Miscellaneous.....	1,076	243	197	30
Totals.....	4,361,785	4,606,415	5,791,376	6,257,159

The distribution was as below:

Year.	East of Mauch Chunk.	Total Coal Tonnage.
1871.....	2,210,272	2,889,074
1872.....	3,009,395	3,850,118
1873.....	3,189,023	4,144,339
1874.....	3,016,636	4,150,659
1875.....	2,417,800	3,277,571
1876.....	3,129,895	3,951,513
1877.. . . .	3,453,533	4,362,124
1878.....	2,758,756	3,446,615
1879.....	3,531,829	4,361,785
1880.....	3,774,729	4,606,415
1881.....	4,498,323	5,791,376
1882.....	4,940,528	6,257,159

Of the tonnage east, there were 1,874,997 tons delivered to the New Jersey Division at Phillipsburg for shipment at Perth Amboy, and 1,404,716 tons to the Belvidere road at the same point for shipment at South Amboy. Of the tonnage north of Mauch Chunk, 109,813 tons were delivered to the Sunbury, Hazleton and Wilkes Barre road; 83,716 tons to the Northern Central, and 708,730 tons to the P. & N. Y. road. Transportation charges were \$1.40 per ton from Mauch Chunk to Perth Amboy. There was a very good demand for Lehigh coal throughout the year, and as the season advanced there were advances made, as the schedule will show:

	Lump.	Broken.	Egg.	Stove.	Chestnut.
Opening .....	\$5 00	\$4 25	\$4 25	\$4 25	\$3 90
Closing .....	5 25	4 50	4 55	4 85	4 75

## PENNSYLVANIA AND NEW YORK RAILROAD.

This line forms the northern connection of the Lehigh Valley Railroad, for its business to the North and West. In addition thereto, it transports a large amount of Anthracite from the mines on its own line and branches, and the Bituminous coal from what is known as the "Barclay" region. The Loyalsock coal mined in Sullivan county, Pa., is shipped over the State Line and Sullivan Railroad to Towanda, and thence to market via this line and its connections. Tonnage has been as below:

Anthracite.. In 1880—705,464 tons. In 1881—1,108,056 tons. In 1882—1,076,966 tons.  
 Bituminous. In 1880—435,516 tons. In 1881— 419,551 tons. In 1882— 371,005 tons.

## CENTRAL RAILROAD OF NEW JERSEY.

Coal carried over the Lehigh and Susquehanna Division of the Central Railroad of New Jersey :

Year.	Tons.	Year.	Tons.
1871.....	1,033,587	1877.....	2,969,788
1872.....	2,537,068	1878.....	2,390,655
1873.....	3,089,697	1879.....	4,088,954
1874.....	2,972,286	1880.....	3,843,209
1875.....	2,661,635	1881.....	4,627,286
1876.....	2,952,520	1882.....	4,606,369

The source of receipt of the coal carried during 1882, was as follows :

Shipped from	Region,	L. & W. B. C. Co.	Gross tons.
Wyoming	"	Everhart C. Co.	1,715,524
"	"	Bennett's.....	44,954
"	"	Fairmount.....	24,196
"	"	Susquehanna C. Co.	21,275
"	"	Delaware and Hudson Canal Co.	235,848
"	"	Red Ash Coal Co.	16,937
"	"	Lehigh Luzerne Coal Co.	164,852
Upper Lehigh	"	Upper Lehigh Coal Co.	87,582
"	"	M. S. Kemmerer & Co.	343,771
Beaver Meadow	"	L. & W. B. C. Co.	168,759
"	"	G. H. Meyer & Co.	446,716
Mauch Chunk	"	Lehigh Coal and Navigation Co.	80,055
Cross Creek	"	Coxe Bros. & Co.	777,286
Council Ridge	"	J. Leisenring & Co.	166,203
Schuylkill	"	Alliance C. M. Co.	203,261
Lehigh Valley R. R.	"	Packerton.....	20,649
R. P. Smith & Co.	"		4,401
			83,947
Total.....			4,606,369

### DISTRIBUTION.

Forwarded East by Rail to Tidal Points.....	2,407,992
" " " Local ".....	1,329,853
" " " use Central Division.....	175,771
" " " L. & S. ".....	19,263
Delivered at and above Mauch Chunk.....	129,451
" at Coalport for Canal.....	309,677
" to L. V. R. R. at Packerton.....	29
" to L. V. R. R. at Sugar Notch.....	234,330
Total.....	4,606,369

## LEHIGH COAL AND NAVIGATION COMPANY.

Year.	Tons.	Year.	Tons.
1872.....	566,724	1878.....	430,987
1873.....	525,623	1879.....	701,761
1874.....	572,470	1880.....	617,989
1875.....	397,427	1881.....	645,338
1876.....	606,773	1882.....	777,286
1877.....	550,519		

This company dates back to 1820, as a mining and carrying company. The figures in the schedule above, are the figures of the production at the 'Summit' mines.

## THE DELAWARE, LACKAWANNA AND WESTERN R. R. CO.

Year.	Tons.	Year.	Tons.
1871.....	1,916,486	1877.....	2,089,523
1872.....	2,836,948	1878.....	2,180,672
1873.....	3,136,306	1879.....	3,867,407
1874.....	2,570,437	1880.....	3,550,348
1875.....	3,326,901	1881.....	4,388,969
1876.....	2,300,500	1882.....	4,595,518

This tonnage includes coal carried, purchased and mined. There are no details of the distribution other than 'North' and 'South.' The tonnage forwarded North includes all the coal sent West, and amounting to 2,053,504 tons in 1882; the tonnage forwarded South is the coal brought to Hoboken, and for the line trade in New Jersey, and amounted to 2,542,014 tons in 1882. The extension from Binghamton to Buffalo, known as the New York, Lackawanna and Western, will prove of great advantage to this company in developing the trade in Anthracite at the West. Their facilities for receiving and transshipping at Buffalo are of great magnitude, and no doubt the tonnage in that direction will in time equal if not exceed the quantity forwarded in an easterly direction.

## PENNSYLVANIA RAILROAD—BELVIDERE DIVISION.

This line forms an important feeder to the Anthracite coal carrying roads centering at Phillipsburg, N.J. The sources of supply, and the distribution of tonnage, are shown below :—

From Lehigh region....	In 1881—1,354,435 tons.	In 1882—1,452,906 tons.	
From Wyoming region.	In 1881— 271,447 tons.	In 1882— 291,717 tons.	
		Tons 1881.	Tons 1882.
Distributed to Trenton for shipment ...		84,399	101,785
Distributed to South Amboy for shipment.....		693,550	730,987
Distribution to local points for consumption.....		732,082	778,408
Coal for company's use.....		115,850	133,473

## COAL TRADE OF THE NEW YORK CANALS.

The quantity carried on the State canals, in both directions, East and West, is stated by the Canal Auditor, to be as below :

QUALITY—Tons, 2,000 LBS.	1878.	1879.	1880.	1881.	1882.
Anthracite.....	681,400	810,517	762,598	902,214	1,032,260
Bituminous.....	207,319	160,538	136,213	209,752	170,854

## LEHIGH AND WILKES-BARRE COAL COMPANY.

Year.	Tons.	Year.	Tons.
1874.....	2,479,382	1879.....	2,189,551
1875.....	2,085,038	1880.....	1,929,881
1876.....	2,300,555	1881.....	2,384,556
1877.....	2,196,864	1882.....	2,162,240
1878.....	1,201,406		

Since 1877, the coal from Summit Hill is not included, these mines being again under the management of the Lehigh Coal and Navigation Company.

## SCHUYLKILL LUMP COAL AT PHILADELPHIA.

Average prices per 2,240 lbs. during the years named :—

1872.....	\$3 74	1876.....	\$3 87	1880.....	\$4 53
1873.....	4 27	1877.....	2 59	1881.....	4 50
1874.....	4 55	1878.....	3 25	1882.....	4 75
1875.....	4 39	1879.....	2 70		

## LEHIGH LUMP AT ELIZABETHPORT, N. J.

Average prices per 2,240 lbs. during the years named :—

1872.....	\$3 82	1876.....	\$4 71	1880.....	\$4 63
1873.....	4 71	1877.....	3 60	1881.....	5 10
1874.....	5 05	1878.....	3 50	1882.....	5 25
1875.....	5 00	1879.....	3 29		

## LOYALSOCK ANTHRACITE COAL PRODUCT.

This coal comes from Sullivan county, Pa., and is shipped over the State Line and Sullivan road to the P. & N. Y. R. R. This business is not included in the statistics elsewhere given :—

1871.....	24,665 tons.	1877.....	23,000 tons.
1872.....	54,966 tons.	1878.....	37,000 tons.
1873.....	35,267 tons.	1879.....	50,000 tons.
1874.....	33,896 tons.	1880.....	65,000 tons.
1875.....	16,522 tons.	1881.....	90,000 tons.
1876.....	30,000 tons.	1882.....	90,000 tons.

The P. & N. Y. received 65,000 tons of this coal for delivery North, East and West ; the difference is made up of local trade.

## LEHIGH CANAL COAL TRADE.

The tonnage for 1882, was 369,003 tons, as compared with 396,109 tons the preceding year. Distribution of last year's business was as below :—

Consumed on line of Lehigh Canal.....	67,339 tons.
Passed into Morris Canal.....	3,883 tons.
“ “ Delaware Division Canal.....	181,898 tons.
“ “ Delaware and Raritan Canal.....	115,881 tons.



## PENNSYLVANIA COAL COMPANY.

The output of coal from the mines of this company is yearly increasing, and the figures for 1882 show a larger business than ever before. Tide coal is received at Weehawken, N. J., and at Newburgh, N. Y., by the Erie Railway from Hawley. We append annual business:

1877:.....	1,118,011 tons.	1880.....	1,123,585 tons.
1878.....	925,995 tons.	1881.....	1,427,747 tons.
1879.....	1,372,759 tons.	1882.....	1,438,820 tons.

The distribution was :

	1880.	1881.	1882.
West by Erie.....	131,917	181,494	209,837
East by Erie.....	986,023	1,239,990	1,221,023
East by D. & H. Canal.....	5,733	6,263	7,960

This company sells its coal to contractors taking their coal in monthly allotments. Prices in open market during last season fluctuated as below:

	Lump.	Grate.	Egg.	Stove.	Chestnut.
Opening.....	\$3 95	\$3 80	\$3 80	\$3 95	\$3 95
Closing.....	4 05	4 10	4 30	4 55	4 55

The completion of the New York and New England Railroad to the Hudson River opposite Newburgh, gives the Pennsylvania Coal Company an outlet, 'all rail,' to points in New England, and a very favorable business was done last year, that will no doubt be greatly extended, from the character of the parties engaged in it. The company is also making a locomotive road on the line of its gravity road from Pittston to Hawley, and this will give it other and most valuable connections East and West.

## DELAWARE AND HUDSON CANAL COMPANY.

Year.	Tons.	Year.	Tons.
1872.....	2,930,761	1878.....	2,144,120
1873.....	2,752,595	1879.....	3,054,390
1874.....	2,399,417	1880.....	2,712,910
1875.....	3,053,817	1881.....	3,211,496
1876.....	1,997,545	1882.....	3,297,826
1877.....	1,929,248		

The distribution has been as below:

	Tons, 1880.	Tons, 1881.	Tons, 1882.
Shipped South.....	59,399	76,866	57,181
To Oswego.....	92,214	122,777	30,338
West via Erie Railway.....	388,262	585,596	359,698
North via Albany and Susquehanna...	402,785	649,665	746,617
To Honesdale for sale and shipment...	1,731,944	1,776,591	2,008,908

Adding the quantity transported for other parties—421,526 tons—this company carried over its railroads and canal 3,719,352 tons of Anthracite coal in 1882. It will be noticed that the trade short of tide-water is increasing very largely. The additional outlet eastward afforded by the 'Erie' Railway to Newburgh, and thence via the New York and New England Railroad, has been availed of, and there will be an increasing trade done over this line as the years go by, for it is advantageous from many points of view.

## THE PHILADELPHIA AND READING RAILROAD COMPANY.

Year.	Tons.	Year	Tons.
1861.....	1,639,535	1872.....	6,185,434
1862.....	2,310,990	1873.....	6,546,555
1863.....	3,065,261	1874.....	6,348,812
1864.....	3,065,577	1875.....	5,505,455
1865.....	3,090,814	1876.....	5,595,207
1866.....	3,714,684	1877.....	7,255,818
1867.....	3,446,826	1878.....	5,909,140
1868.....	4,574,874	1879.....	8,147,579
1869.....	4,239,457	1880.....	7,179,398
1870.....	4,633,504	1881.....	8,072,440
1871.....	6,002,573	1882.....	8,429,825

The above is the total coal tonnage carried, and below will be found the distribution of the quantity so carried, during the fiscal year ending in 1882 :—

Passing over Main Line and Lebanon Valley Branch.....	5,174,992 tons.
For shipment by Schuylkill Canal.....	508,897 tons.
Shipped Westward via Cat. and Wpt. Br. and N. C. Railroad.....	517,352 tons.
Shipped East via Lehigh Valley Railroad.....	102,058 tons.
Shipped West and South from Pine Grove.....	122,502 tons.
Consumed on Laterals.....	114,619 tons.
Lehigh and Wyoming coal.....	922,432 tons.
Bituminous.....	400,192 tons.
Coal for Company's use.....	566,779 tons.

Of the coal produced from the lands owned by the company during the years 1873–82, together with the reported average cost of coal in cars at the mines, the following schedule is given :—

	Leases produced.	P. & R. C. & I. Co. produced.	Average cost at mines.
1873.....	2,055,565 tons.	1,348,838 tons.	\$2.51 per ton.
1874.....	1,802,370 tons.	1,374,790 tons.	2.45 per ton.
1875.....	1,594,741 tons.	1,510,572 tons.	1.87 per ton.
1876.....	1,218,533 tons.	1,853,364 tons.	1.35 per ton.
1877.....	1,389,108 tons.	3,794,528 tons.	1.04 per ton.
1878.....	1,100,181 tons.	2,727,608 tons.	1.24 per ton.
1879.....	1,300,322 tons.	4,269,929 tons.	1.14 per ton.
1880.....	1,235,642 tons.	3,460,464 tons.	1.43 per ton.
1881.....	1,484,992 tons.	3,937,607 tons.	1.49 per ton.
1882.....	1,512,954 tons.	4,111,830 tons.	1.47 per ton.

Philadelphia takes over a million tons of Schuylkill coal, carried by this company; there is a shipping business of two million tons at Port Richmond, and the 'line' deliveries aggregate nearly two millions of tons. This company also sends coal through to the tide-water shipping port of Elizabethport, N. J. The coal tonnage originating at collieries tributary to this railroad company is stated to have been 7,000,113 tons during the calendar year 1882, thus making it the largest Anthracite coal carrier.

The ton named is of 2,240 lbs., and the year in all tabular statements ends with November 30th.

## THE PRODUCTION OF ANTHRACITE, LIVES LOST, ETC.

The report of the Inspectors of Mines, for 1881, gives the following statistics:

	Tons Mined.	Employees.	Fatalities.	Average Days' Work.
I.....	1,829,656	6,497	18	202½
II.....	4,504,624	10,911	34	215½
III.....	4,432,601	11,865	48	217½
IV.....	7,021,508	16,808	75	221½
V.....	7,711,660	18,840	47	238
VI.....	5,037,948	11,386	47	219

I.—First, or Pottsville district. II.—Second, or Shenandoah district. III.—Third, or Shamokin district. IV.—Wilkes-Barre district. V.—Eastern district of Luzerne and Lackawanna counties. VI.—South district of Luzerne and Carbon counties. The tonnage mined (reported above) includes coal used about mines, and sold to employees. It averages seven to eight per cent. of the quantity marketed. The number mentioned as employed includes miners, laborers, and men and boys, inside and outside. The figures as the average number of days worked in each district are from the official figures. In the usual course of events the best collieries work the greatest number of days and the smaller ones lay idle, and it is these that reduce the average.

## ERIE RAILWAY—ANTHRACITE TONNAGE.

The tonnage reported below represents the production of mines in which the New York, Lake Erie and Western Railway is interested:

Year.	Tons.	Year.	Tons.
1871.....	55,596	1877.....	175,095
1872.....	83,288	1878.....	278,132
1873.....	36,728	1879.....	437,509
1874.....	197,562	1880.....	411,094
1875.....	303,039	1881.....	465,230
1876.....	230,709	1882.....	330,510

In regard to prices of anthracite coal at tide-water, it can hardly be said that the circular rates were realized at any time, as a rule, but advancing circulars enabled the coal to be moved quickly. The opening prices were made by the Pennsylvania Coal Company, on the 18th of March; they were

Lump.....	\$3 95	Stove.....	\$3 95
Steamer.....	3 95	Chestnut.....	3 90
Grate.....	3 80	Pea.....	2 80
Egg.....	3 80		

After various advances, the season closed with the following schedule, for Pittston coal at Newburgh

Lump.....	\$4 05	Stove.....	\$4 55
Grate.....	4 10	Chestnut.....	4 55
Egg.....	4 30	Pea.....	3 80

The other companies made rates on March 21st. Quotations were as below for Scranton, Lackawanna and Wilkes-Barre coals, F. O. B.

Lump.....	\$3 90	Stove.....	\$4 20
Grate.....	3 90	Chestnut.....	3 90
Egg.....	4 05	Pea.....	3 00

Lehigh was quoted at \$5.00 for Lump ; \$4.25 for Broken, Egg and Stove, and \$3.90 for Chestnut. Advances were made at various dates, until the close of the year. Final circular prices were as below for free burning:

Lump.....	\$4 30	Stove.....	\$4 85
Grate.....	4 30	Chestnut.....	4 85
Egg.....	4 55	Pea.....	3 60

Lehigh was quoted at \$5.25 for Lump ; \$4.50 for Grate ; \$4.55 for Egg ; \$4.85 for Stove and \$4.75 for Chestnut.

Anthracite is carried eastward into New England, all rail, by the following lines : By the N. Y. & N. E. from Newburgh ; by the Albany and Susquehanna via Albany ; by the D. L. & W. from Hoboken via Port Morris and the New Haven R. R.

The building of the Jersey Shore, Pine Creek and Buffalo Railway, from Stokesdale to Williamsport, a distance of 72 miles, makes a connection between the railway systems of the Philadelphia and Reading, and the New York Central Companies. It is stated that the Reading company is to give one third of its annual product to the new line.

The opening prices of Anthracite coal for western delivery were made on April 12th, and were as below on cars at Buffalo, Salamanca and the Bridges.

Grate and Egg \$4.60 gross ton.—Stove and Nut \$4.85 gross ton. At Buffalo, F. O. B. add thirty cents per ton. Various advances were made during the season, and at the close rates stood as below, at Buffalo, etc., on cars.

Grate.....	\$5 15 gross ton.	Egg.....	\$5 30 gross ton.
Stove.....	5 60 gross ton.	Nut.....	5 80 gross ton.

At Buffalo, F. O. B. add thirty cents per ton.

Through the building of the South Pennsylvania Railroad, (Harrisburg and Western) the Philadelphia and Reading Company will have a southwestern outlet, and lines in the Vanderbilt interest will have an eastern outlet, the connection to be made at or near Harrisburg.

In regard to the transportation on Anthracite, we find that during 1882, the Lehigh Valley Railroad charged \$1.40 from Mauch Chunk to Perth Amboy. The charge by canal to New York from Mauch Chunk was \$1.65 per ton. The Philadelphia and Reading Company charged \$2.00 per ton to Philadelphia, for shipment. To Elizabethport, per P. R. R. \$2.10 per ton. The C. R. R. of N. J. and the D. L. and W. Co., carry coal on a percentage of the price, F. O. B. ranging at 50 per cent. From Coxton, to Buffalo, in coal cars the rate was \$2.69 to \$3.11 per ton, and 30 cents less in box cars. From Penn Haven to Buffalo from \$2.64 to \$3.06 in coal cars, and 30 cents less in box cars ; rates advance with the circular price of coal at Buffalo.



## DISTRIBUTION OF ANTHRACITE OUTPUT—1881.

Mr. John H. Jones furnishes statement of the general distribution of Anthracite coal in year 1881, in tons of 2,240 pounds :

<i>Competitive.</i> —Including tonnage passing out of Capes of Delaware ; to New York Harbor ; to points on Hudson River ; Long Island Sound and Atlantic Coast, North of Port Judith.....	12,169,030
<i>Western.</i> —Including tonnage to United States points west of Buf- falo and the Detroit River, Erie, Pittsburgh and Baltimore .....	2,079,134
<i>Canadian.</i> —Including all tonnage by Lake and Rail to points in Dominion of Canada.....	694,428
<i>Southern.</i> —Estimated tonnage to all points in Delaware, Maryland and the territory bounded by the Ohio and Missis- sippi River on the north and west and the Gulf of Mexico on the south.....	800,000
<i>Pacific Coast</i> .....	15,000
<i>Local.</i> —Embracing all coal consumed in Pennsylvania, New York and New Jersey.....	12,742,424
Total production in 1881.....	28,500,016

## THERE WAS SENT TO WESTERN UNITED STATES POINTS.

	Gross tons.
By Lake from Buffalo.....	839,465
By Rail from Buffalo and the Bridges.....	616,044
By Lake from Erie.....	85,030
By Rail from Erie.....	166,258
By Rail from Pittsburgh, Balt., Salamanca, Dunkirk, &c.....	309,191
From Lake Ontario ports through the Welland Canal... ..	63,146
	2,079,134

## TO CANADIAN POINTS

By Lake and Rail.....	694,428
Total to Canada and the West.....	2,773,562

Details for 1882 cannot be worked up for some time, but many facts and figures embraced in above are given in the pages of this work.

## THE CONNELLSVILLE COKE REGION.

Every operator in coal which has coking qualities, endeavors to show by analysis that it equals Connellsville. In no single industry in the United States, probably, has so much capital been invested, and such rapid strides and progress made since 1872. At that time there may have been 2,000 ovens, now there are 11,000. The Connellsville district is situated in the southwestern part of the State of Pennsylvania, lying mainly in the counties of Westmoreland and Fayette, and distant some 50 to 60 miles from Pittsburgh. The coal basin is 50 miles in length, by about 3 miles in width; and the coal seam is from 8 to 9½ feet in thickness. From this little strip of territory is drawn the solid carbon which feeds blast and smelting furnaces from Lake Champlain on the East, to Omaha and Salt Lake on the West, and from Canada to Texas.

In coking the coal, the beehive oven is in universal use in the Connellsville region. These ovens vary, at the different works, from 11 to 12 feet in diameter, and from 5 to 6 feet in height. The working is very simple. The coal is dumped through an opening in the crown of the furnace, and spread evenly on the floor, to the average depth of 2 feet for 48-hour coke, and 2½ feet for 72-hour. The front opening, through which the coke is discharged, is at first nearly closed with brick, luted with loam. The heat of the oven from the previous coking fires the charge, and as the coking progresses, the air is more and more shut off by luting the openings, and finally closing the roof openings. The average charge is 100 bushels of coal at 76 lbs., and the yield in coke, 120 bushels at 40 lbs., making the percentage yield 63, or 1.6 tons of coal to 1 ton of coke. The average time of coking is 48 hours, with 72 hours for that burned over Sunday; 24-hour coke is sometimes made. The 72-hour coke is firmer coke than either of the others, but it is questionable whether it is a better furnace coke. When the coke is thoroughly burned the door is removed, and the coke is cooled by water thrown in from a hose, and then drawn. The actual cost of building one of these coke ovens is said to be \$200. A well informed coke manufacturer gives the cost of opening up a mine, and building a large coke works, laying the roads, putting up necessary machinery, pit wagons, mules, &c., and building the ovens ready to light up, as an average cost not less than \$500 to the oven.

The coal is Bituminous, with generally a dull resinous lustre, alternating with seams of bright, shining, crystalline coal, coated with a yellowish silt. It contains numerous particles of slate, and some crystals of pyrites. It is compact, with a tendency to break up into cubes. One of the latest analyses that we have of this coal, showed—fixed carbon, 64.18; vol. matter, 28.50; ash, 6.12; sulphur, 0.6; moisture, 1.20. It yields a coke which is nearly ninety per cent. fixed carbon and less than one-half of one per cent. sulphur. In the neighborhood of Broadford the mines are entered by drifts, but farther back they are generally entered by slopes and shafts, some of them over 200 feet deep. The coal is quite soft, no drilling or shooting being required to get it down. In a number of the mines only from 7 to 8 feet is mined, the balance being left up for roof, which is generally recovered when the pillars are drawn. The miners receive 30 cents per wagon of 33½ bushels, run of mine, not being required to throw anything back in the "gob."

Coke varied in price but little all the year 1882, averaging about \$1.50 per ton at the ovens. There was a short supply of cars at all times, but the average weekly output is stated to have been 60,000 tons. The charge for carrying coke from the ovens to Pittsburgh is \$1.16 per ton, while to Chicago, ten times the distance, the rate is \$4.67 per ton. The fact that three great railroad corporations—the Pennsylvania Central, the Baltimore and Ohio, and the Vanderbilt line (the P., McK. & Y.)—are vying with each other to get their branches and sidings into the various large works in the region for this trade alone, is evidence that the business is to be a permanent and paying one.

The making of crushed coke for domestic uses is an important business. In order to adapt it for general use without rendering it necessary to change stoves, grates or furnaces, the H. C. Frick company conceived the idea of crushing into

sizes to correspond with the sizes of Anthracite coal, viz.: egg, stove, small stove and nut, so that parties ordering would have no difficulty in knowing just what size they required. It is used domestically for cooking, in base burning stoves, furnaces, and in open grates. Large quantities are used at hotels for broiling purposes, it making a very clear and hot fire. Manufacturers of safes, chains, axles, shovels, files, bolts, agricultural implements, brass foundries, malsters, blacksmiths, etc., use the small stove or nut sizes. Steel manufacturers, as a rule, prefer the stove size for their crucible furnaces. Tube works use the 'egg' size.

It has been suggested that the carbon black that is wasted at the ovens, might be made of use and value. Eight pounds per oven per day might be collected, and one boy could serve fifty ovens.

Below will be found a list of the owners of ovens, and the number of the same:

## MOUNT PLEASANT BRANCH.

H. C. Frick Co., Henry Clay.....	100
" Frick.....	106
" Morgan.....	164
" Summit.....	142
" Eagle.....	80
" Foundry.....	74
" White.....	148
" Tip Top.....	56
" Valley.....	152
Cochran & Keister.....	50
" .....	44
J. R. Stauffer & Co.....	40
McClure & Co.....	258
Fairchance Iron Co.....	30
John M. Cochran, heirs.....	116
B. F. Coughenour & Co.....	20
Boyle & Rafferty.....	261
Mullen & Strickler.....	82
Charlotte Furnace Co.....	81
J. W. Moore & Co.....	200
	2,204

## FAYETTE CO. BRANCH.

Cambria Iron Co.....	99
J. M. Reid.....	76
Morgan, Laing & Co.....	100
Dunbar Furnace Co.....	159
S. Colvin & Co.....	80
A. O. Tinstman & Co.....	127
Percy Mining Co.....	62
Youngstown Coke Co.....	240
Lemont Furnace Co.....	120
Stewart Iron Co.....	80
	1,243

## HICKMAN RUN BRANCH.

Cochran & Keister.....	100
J. M. Schoonmaker.....	304
J. S. Newmeyer & Son.....	40
	444

## S. W. PA. R. R. BRANCHES.

Chicago & Con. Coke Co.....	200
Rainey Bank Coke Co.....	300
A. H. Sherrick.....	70
Sherrick & Wiley.....	20
S. W. Coal & Coke Co.....	68
Hurst, Stoner & Co.....	70
S. W. Coal & Coke Co.....	72
Dillinger & Rafferty.....	50
S. W. Coal & Coke Co.....	100
Dillinger, Tar & Co.....	64
Mahoning Coke Co.....	100
Moorewood Coke Co.....	470
Cambria Iron Co.....	400
Connellsville Coke & Iron Co.....	200
Connellsville Gas Coal Co.....	200
A. C. Overholt & Co.....	110
J. F. Overholt.....	36
Markle & Co.....	108
Markle & Son.....	170
J. M. Schoonmaker.....	200
H. C. Frick Co. Monastary.....	208
Tox, Keifer & Co.....	18
	3,234

## PITTSBURGH DIV. B. &amp; O.

Fayette Coal Co.....	100
Jackson Mining Co.....	62
Laughlin & Co.....	115
J. M. Schoonmaker.....	159
W. J. Rainey.....	40
Cochran, Son & Co.....	35
A. A. Hutchinson & Bro.....	400
Pitts. & Conn. G. C. & C. Co.....	253
	964

## OVENS IN GAS COAL DISTRICT.

W. H. Brown & Co.....	20
Patrick Connelly.....	24
Yough Coal Hollow C. Co.....	20
W. L. Scott & Co.....	30
Waverly Coal & Coke Co.....	100
	194

## BROAD TOP SEMI-BITUMINOUS COAL FIELD.

An outlet for the coal from the region is afforded by the Huntingdon and Broad Top Mountain Railroad (this was completed in 1856, and during the latter part of that year 42,000 tons were forwarded from this region to various markets.) The line extends from the town of Huntingdon, on the Pennsylvania Railroad, 203 miles west of Philadelphia, to Mt. Dallas, in Bedford county, a distance of 45 miles. At Saxton, 24 miles from Huntingdon, a branch road, 10 miles in length, extends to Broad Top City; at Riddlesburg, 5 miles beyond Saxton, is a branch into Fulton, 5 miles from the main road.

From Mt. Dallas the Bedford and Bridgeport Railroad, 38 6-10 miles in length, extends to the Maryland State line; from this point to Cumberland, Md., via the Cumberland and Pennsylvania Railroad is 7 miles. At or near Cumberland, connection is made with the Cumberland and Pennsylvania, and the George's Creek and Cumberland roads. This connection gives an outlet for the Cumberland coal to the interior markets of Pennsylvania, to Philadelphia and South Amboy, N. J. The Bedford and Bridgeport road is leased to the Pennsylvania Railroad, and operated by them.

We append details of the tonnage of the Huntingdon and Broad Top road, during the past ten years.

1873.....	350,245 tons.	1878.....	150,204 tons.
1874.....	226,693 tons.	1879.....	141,594 tons.
1875.....	204,921 tons.	1880.....	174,736 tons.
1876.....	159,779 tons.	1881.....	204,819 tons.
1877.....	140,143 tons.	1882.....	271,216 tons.

The shipments of Cumberland coal over the Pennsylvania and Huntingdon and Broad Top Railroads have been as below :

1873.....	114,589 tons	1878.....	163,598 tons.
1874.....	67,671 tons	1879.....	171,930 tons.
1875.....	175,154 tons.	1880.....	242,593 tons.
1876.....	145,796 tons.	1881.....	313,600 tons.
1877.....	187,488 tons	1882.....	208,031 tons.

The East Broad Top Railroad penetrated this coal field in 1875 : there were delivered to the Pennsylvania Railroad at Mt. Union, 43,567 tons of coal during 1875, 66,104 in 1876, 54,738 in 1877, 63,068 in 1878, 67,929 in 1879, 72,450 in 1880, 91,745 tons in 1881, and 99,095 tons in 1882. In addition, some 49,577 tons were last year used in the furnaces, on the line of the E. B. T. road.

The coal measures are regular in structure, with gentle undulations dividing the field into several synclinals or basins. The coal is semi-Bituminous in its nature, and has been largely used for blacksmithing purposes, for generating steam in locomotives, marine and stationary engines, in rolling mills, puddling furnaces and forge fires; with glass works it is an especial favorite. It gives a white ash, is free burning, and easily ignited. Included in this region, are all the mines in Huntingdon and Bedford counties. The increase in the output last year was due to the new furnace at Saxton, and also to the idleness in the Cumberland coal district.



## THE MONONGAHELA REGION.

By means of its slack-water navigation, the Monongahela river is made navigable at all seasons of the year, and boats carrying eight hundred tons are passed down. The city of Pittsburgh is supplied mainly by railroad, and the larger portion of the coal shipped by river is run down the Ohio and Mississippi to the lower markets. The following statement of shipments by the slack-water navigation, from 1860 to date, is of interest.

Year.	*Tons.	Year.	*Tons.
1860.....	1,517,909	1872.....	2,291,220
1861.....	834,630	1873.....	2,094,312
1862.....	743,358	1874.....	2,503,504
1863.....	1,134,150	1875.....	2,275,265
1864.....	1,402,828	1876.....	2,495,800
1865.....	1,580,791	1877.....	2,677,460
1866.....	1,704,212	1878.....	2,797,530
1867.....	1,202,908	1879.....	2,623,232
1868.....	1,812,040	1880.....	3,361,934
1869.....	2,100,504	1881.....	3,450,186
1870.....	2,303,856	1882.....	4,057,384
1871.....	1,944,852		

It will be noticed that there is a very large increase in the tonnage last year ; in fact it is the largest on record, being nearly double that of ten years ago. This in spite of all the railways that there are penetrating new and old coal fields in this part of Pennsylvania, and in the states that lay to the south of the Monongahela, and sending coal into the ports and places that have been supplied by coal from Pittsburgh.

This great increase in the shipments out of the Monongahela has made a demand for greater facilities in getting boats and tows through the locks, and to do this machinery is now used at first four dams, and the Navigation Company can now pass two millions of bushels of coal in twenty-four hours. As the business increases work extends further up the river. Heretofore one lock at No. 3 Dam has done the work, but lately it is not sufficient to meet the demand, and the company are now putting in a new lock which will be completed this year. This will greatly increase the facilities at that point, as it will be of sufficient capacity to pass 3 barges and 1 tow-boat at once. At Lock No. 1 the company has a new chute put in the dam, 120 feet long.\* This contains a movable dam capable of being raised or lowered, and at times of high water it is expected to be able to open this chute and give boats an uninterrupted passage. The Navigation Company has now in course of erection, just below Greensboro, Pa., the new lock and dam No. 7. The lock is nearly done, and the dam fairly under way. This, when finished, will complete navigation to Morgantown, W. Va., a distance of 102 miles from Pittsburgh.

The miners were well employed throughout the year at 4 cents per bushel, or \$1.06 per ton. In addition to the coal carried there was 189,340 tons coke shipped by water.

\* We have estimated 25 bushels, of 80 lbs., to the ton of 2,000 lbs.

THE KANAWHA REGION.

Each year there is an increasing coal trade from the New River and Kanawha districts. The following list of the operators and location of their mines (by distance from Richmond on C. & O. Railway), as prepared by Jed. Hotchkiss, will show the importance of the coal trade in this region :

Miles to Richmond.	Owners or Operators.	Miles to Richmond.	Owners or Operators.
294	Quinnimont.	343	Cannelton Coal Co.
305	Fayette Coal & Coke Co.	343	George Straughan.*
309	Wm. Beury, Cooper & Co.	343	Union Coal Co.
310	Fire Creek Coal & Coke Co.	343	Mount Morris Coal Co.
313	Longdale Iron Co.	343	Carver Brothers.
315	New River Coke Co.	343	M. T. Davis & Co.
315	Wm. Beury, Cooper & Co.	343	"
316	Nuttallburg Coal Co.	344	Kanawha Mining Co.*
317	"	344½	Wyoming Coal Co.*
321	Masters & Straughan	348	Paint Creek Mining Co.
321	W. A. Burke & Co.	348	Wacomah Mining Co.*
322	Gaymont Coal Co.	349	Crown Hill Coal Co.*
323	"	350	Heuson, Talley & Co
324	Russell Brothers.	351	Stuart M. Buck.*
324	Hawk's Nest Coal Co.	351	" *
340	St. Claire Coal Co.	352	Robinson Coal Co.*
340½	William Wyant.	353	Cabin Creek.*
340½	Frederick Faulkner.*	356	Winifrede Coal Co.*
341½	W. R. Johnson, Jr.*	356	Cincinnati Coal & Coke Co.*
341½	" *	364	Wm. S. Carkin.*
341½	"	374	Davis Creek.*
343	Coal Valley Coal Co.		

COLLIERIES ON NORTH SIDE OF KANAWHA.

1. Cedar Grove.....Co-operative Coal Co.
2. Peabody.....Peabody Coal Company.
3. North Coalburg.....George Straughan.
4. Dana.....Dana Brothers.
5. Campbell Creek.....Campbell Creek Coal Co
6. Lewis.....W. D. Lewis & Co.
7. Pioneer.....Pioneer Coal Co.
8. Raymond City.....Marmet Mining Co.
9. Queen City.....Queen City Coal Co
10. Oak Ridge.....Oak Ridge Coal Co

1, 2 and 3 are nearly opposite Coalburg, 352 miles west of Richmond.

4, 5, 6 and 7 are nearly opposite Malden Station.

8 and 9 are 18 to 20 miles below Charlestown, on the Kanawha division of the Ohio Central R.R.

10 is below Raymond City, on the Kanawha.

\* Collieries ship by river.

## COKE OVENS ON C. &amp; O. RAILWAY.

1. Low Moor.....	Low Moor Iron Co. of Va., 122
2. Quinnimont.....	John F. Hartranft, 100
3. Stone Cliff.....	Fayette Coal & Coke Co., 60
4. Fire Creek.....	Fire Creek Coal and Coke Co., 60
5. Sewell.....	Longdale Iron Co., 120
6. Nuttall.....	John Nuttall, 50
7. Gauley Mountain.....	Hawk's Nest Coal Co., 160
8. St. Claire.....	St. Claire Coal Co., 30
9. Eagle.....	William Wyant, 24
10. Straughan.....	George Straughan, 4

The Chesapeake and Ohio Railway has been completed to Newport News, 75 miles below Richmond, and extensive transfer and shipping facilities have been erected there, and a large coal business is being built up in the supplying of steamers making this a port of call. The extension of the line west and south also ensures an increasing trade, and the figures given below will show that a beginning has been made in this direction. The shipments by the Kanawha river must also increase; we put the tonnage at 600,000 tons. In 1870 they were 171,000 tons, and in 1880, 480,000 tons.

Business of the Chesapeake and Ohio Railway, was :—

	Cannel.	Gas.	Splint.	Steam.	Coke.
Year 1880.	43,080	.....	526,990	.....	26,374
Year 1881.	25,183	229,564	177,786	263,517	77,376
Year 1882.	30,910	345,905	124,422	357,744	91,919

Last year's tonnage was distributed as below :—

For use of C. & O. Railway Company.....	189,617 tons.
On line of road west of Richmond.....	127,261 tons.
At Huntingdon for shipment on Ohio River.....	49,535 tons.
To connecting railroads.....	152,796 tons.
At Richmond for consumption.....	116,536 tons.
At James River wharves for shipment.....	187,933 tons.
At Newport News for shipment.....	126,262 tons.

Total coal mined and carried. .... 950,900 tons.

Analyses of the Coal and Coke of this region :—

Of the Coals.	Cannel.	Gas Coal.	Quinnimont.	Nuttallburg.	Cabin Creek.
Fixed Carbon.....	23.50	56.65	75.89	70.67	57.17
Volatile matter.....	58.00	35.75	18.19	25.35	38.97
Moisture.....	.....	1.08	0.74	1.35	2.93
Ash.....	18.50	5.18	4.98	2.10	.97
Sulphur.....	.....	1.32	...	0.57	...
Of the Cokes.	Sewell.	Nuttallburg.	Quinnimont.	Quinnimont.	
Fixed Carbon.....	93.00	91.22	93.85	91.72	
Ash.....	6.73	7.53	5.85	5.09	
Sulphur.....	0.27	0.92	0.30	0.48	

Collieries to Newport News : Kanawha 418 miles ; New River 382 miles.

## WESTMORELAND REGION.

In Westmoreland county, Pa., is located an extensive area of Bituminous coal of the best quality. In fact, its reputation has been earned for many years, as the typical coal for gas making purposes. It is used in almost every seaboard city, and the interior trade is also large; all other coals are sold as near the price of this article as the best efforts of the seller can achieve. The celebrated Penn. and Westmoreland gas coals are mined near Penn. and Irwin stations on the line of the Pennsylvania railroad, while Scott & Co.'s Ocean Yonghiogheny mines are on the Baltimore & Ohio road, as are also the Waverly mines. It will thus be seen that two trunk lines are subservient to the interest of the gas coal trade, and the eastern market can be reached from Baltimore, Philadelphia and South Amboy. Considerable development of steam coal and coking coal has been made in this county within the year and the output will largely increase. The Pennsylvania railroad reports a traffic of 1,278,121 tons coal and 267,383 tons coke for 1882, and preceding shipments of coal had been, by this line :—

Year.	Tons.	Year.	Tons.
1874.....	952,971	1878.....	692,586
1875.....	796,968	1879.....	816,302
1876.....	906,139	1880.....	943,177
1877.....	786,039	1881.....	982,293

## WEST VIRGINIA GAS COAL.

That quality of coal known in the New York and Eastern markets as 'West Virginia Gas Coal' is mined in Marion, Taylor, Ritchie and Preston counties, West Virginia, the mines being located near to or upon the main line of the Baltimore and Ohio Railway. The coal is used for gas making in the cities of the seaboard, and is very favorably spoken of. Analyses of these coals have given the following results :

	Volatile matter.	Fixed carbon.	Ash.
Clarksburg, main seam.....	56.74	41.66	1.60
Clarksburg Cannel.....	49.21	45.43	5.36

Professor Doremus's analysis of the Montauk coal which is mined at Flemington, Taylor county, was as below :

Carbon.....	80.8200	Moisture.....	1.0500
Hydrogen.....	5.5200	Ash.....	3.8400
Oxygen and nitrogen. ....	8.4706	Sulphur.....	0.2994

There is an output of about half a million tons; this is mined by the Despard, Newburg Orrel, Tyrconnel, Fairmount, Consolidated, Monongahela and Montauk Coal Companies. There was a fair trade last year, at prices that averaged perhaps \$4.50 at New York. A large proportion of the trade is done to Baltimore and to the western cities for gas making purposes, but the coal must always remain a favorite with the gas companies of the seaboard.

In recapitulating West Virginia's coal output it will be seen that two millions of tons is none too large an estimate. We have the coal by Kanawha river; that by the C. & O. Railway; the gas coal on line of B. & O. Railroad, and the Bituminous coal on the West Virginia Central Railroad.



## REYNOLDSVILLE REGION.

This is a district which has shown great advancement within the past year, and many new lines of railway are projected to it. The Allegheny Valley low grade has been the outlet, but now we have the Rochester & Pittsburgh; the Bradford extension of the N. Y., L. E. & Western; the McKean & Buffalo extension of the B., N. Y. & P. The output has averaged some three thousand tons a day, but of course this will now be largely increased. Geographically the Reynoldsville coal basin is located in the southeast portion of Jefferson county, Pa. Its range is northeast and southwest; its northeastern boundary being in the vicinity of Falls Creek, on the Low Grade Railroad, and its southwestern boundary about one and one-half miles west of Punxsutawney.

The basin contains what are known as the Freeport and Kittanning Bituminous coal measures.—The first, or upper, are the upper and lower Freeport beds, each being from five to seven feet in thickness. The second, or lower, are the Kittanning upper and lower beds, each being from three and one-half to four feet in thickness. The basin above water level occupies the divide between the Sandy Lick Creek and the head-waters of the Little Sandy Creek on the northwest, and Stump Creek on the southeast, lying like a vast sheet, it gently dips towards the southeast, to the waters of Stump Creek and there disappears beneath the surface. The quality of the coal is excellent both for gas and steam purposes and the manufacture of coke, as the steady increase in production from year to year fully attests. For steam purposes it is equalled by none in the market, unless it may be the George's Creek or Salisbury coals. As a gas coal it is very good, but not quite up to the high standard of the celebrated Youghiogheny, but it is capable of producing an average of 9,500 cubic feet of gas to the ton, and its illuminating value is about fifteen candle power. It makes an excellent quality of coke of fine lustre and high percentage of fixed carbon, and is equal to any for blast furnaces and foundry purposes. The demand for this coal has increased rapidly within the past three years, to such an extent, in fact, that it is gradually absorbing the northern market, northwestern New York, the lake ports and Canada, Buffalo city being the chief point. Commercially the coal at Tylers, Du Bois and Sandy Lick, in the northwestern portion of Clearfield county, is sold in market with the coal from a little further west, in Jefferson county. The prominent coal operators here are the Sandy Lick Coal Co.; Clearfield Coal Co.; Powers, Brown & Co.; Bell, Lewis & Yates; Frank Williams & Co. The Rochester and Pittsburgh C. & I. Co. own a very large territory that is being rapidly developed. In fact there is no region in Pennsylvania, that we know of, that has a brighter future or affords greater inducements for the investment of capital than this, and the time is not far distant when this will be one of the great industrial centres of the State.

## ALLEGHENY MOUNTAIN REGION.

We include in this district all the collieries located near to or upon the Pennsylvania Railroad, in Blair and Cambria counties, producing about one million tons of coal per annum. Many large consumers of coal, such as the Cambria Iron Works, are located in this district. There were carried to market by the Pennsylvania Railroad 526,676 tons coal and 110,356 tons coke, last year. The Sonman vein coal is well known and much liked, and a larger business was done last year. An analysis of this coal shows: Vol. matter, 18.30; fixed carbon, 78.60; ash, 2.70; sulphur, 0.40. Martin & Co.'s Trout Run mines have been largely developed in the past year, and still further improvements are to be made early in 1883. A trade in this coal both east and west has been made in the past year. We give analysis, as made by A. S. McCreath. Fixed carbon, 77.132; volatile matter, 18.535; moisture, 0.840; sulphur, 0.573; ash, 2.920; coke, 80.625; color of ash, cream. D. Eldridge has opened up the Sonman shaft colliery in this district and is shipping coal to tide-water.

## CLEARFIELD REGION.

Statistics of the output since the beginning, show the increasing business done in the coal from this district. The returns are in tons of 2,000 lbs.

Year.	Tons.	Year.	Tons.
1867.....	169,219	1875.....	928,297
1868.....	171,238	1876.....	1,281,861
1869.....	259,994	1877.....	1,374,927
1870.....	379,863	1878.....	1,295,201
1871.....	542,896	1879.....	1,631,120
1872.....	431,915	1880.....	1,739,873
1873.....	592,860	1881.....	2,401,987
1874.....	639,630	1882.....	2,838,970

This district again shows an increased output, and it is claimed by the operators that had there been a full supply of cars and motive power, three million tons could have been shipped. A large special car service was put into this district by the Pennsylvania Railroad Company, but these special cars did not seem to afford any extra tonnage facilities, but rather took the place of regular cars; at least this was the constant cry of the operators. The large increase in tonnage for 1882 is no doubt due to the long suspension of labor in the George's Creek Region, which lasted five months. An attempt was made to induce the men in Clearfield to go out for 65 cents, and a few agitators declared the district on strike on the 24th of June; this practically had no effect and all hands who could secure work, returned to their labors.

The trade was not very remunerative during 1882, on the tidewater business, as the large contracts were made at very low rates, and there was no advance in price during the period that the George's Creek mines were idle; an average of \$4.25 at Amboy, and \$3.50 at Philadelphia, may be said to represent the result of the year's business. Low rates of tolls or special drawbacks, made the chance for competition in the market unequal, as between all the operators in the spring and summer, and it was not until October that the full force of this state of affairs was felt. The special rates have been cancelled and all operators are said to be on the same basis as to the tolls paid.

There have been large purchases of land in Clearfield county, by friends of the Vanderbilt roads, and the consequent result is the building of a railroad into this county, that may be extended to help the other operators. It has long been the opinion that an additional outlet was necessary, as the output was growing, and the Pennsylvania company has located a line from the P. & E. road at the Sinnamahoning, via Karthaus to the Moshannon; this is down grade, and when built would be a great relief to the operators. The Beech Creek, Clearfield and Southwestern road getting into the heart of the coal deposits via Beech Creek is the best outlet to markets north, east and west, via the Reading and New York Central lines.

All the coal recorded in the tonnage given above, passes over the Tyrone and Clearfield branch of the Pennsylvania railroad, which intersects the main line at Tyrone, 224 miles west of Philadelphia. There is a large trade along the line, and the coal for eastern shipment goes to Baltimore, Philadelphia and South Amboy; there is a fair all-rail tonnage eastward via Elmira and Albany, and some coal has gone via

Newburgh. At Baltimore, a new pier has been built during the past year (400x45 feet that will handle this coal for the local and steamer trade.

As has been recorded in previous editions of this annual, the coal is used for steam purposes under stationary, marine, or locomotive engines ; for making iron and steel rails ; for glass works ; in lime kilns ; and many other purposes, being much liked wherever used ; ignites freely, burns readily, and leaves a white ash. It is not easily friable, and bears transportation remarkably well. The analysis of Clearfield coal shows an average of about 70 per cent. carbon, and 22 per cent. volatile matter, leaving eight per cent. water, sulphur and ash. The highest percentage of carbon as per table of analyses made by Geological Survey, is 74.284 in coal from 'Franklin' colliery ; 21.360 of volatile ; 3.351 ash, and .670 moisture, with .435 of sulphur being the other constituents.

There are many operators in this region, but not more than a round dozen are known to the buyers, for there is a considerable traffic in the product of the small mines, by the larger operators. At the large collieries, there is every effort to produce coal cheaply, by the introduction of labor saving appliances, and the underground haulage of coal by wire ropes has reached perfection in this region.

Average distance from collieries in this region to Philadelphia 255 miles ; to South Amboy 322 miles ; to Baltimore 227 miles.

### McKEAN COUNTY, PA.

In this county there is a large deposit of prime Bituminous coal. There are two points from which coal is mined and marketed at present. At the eastern portion of the basin, the Buffalo Coal Company is at work near Clermont. On the McKean and Buffalo Railroad, an extension from Larabees of the Buffalo, New York and Philadelphia Railroad, and this gives an outlet for the coal of this section to Buffalo and Rochester. Output of coal by the Buffalo Coal Company, since the opening of the mines :

Year.	Tons.	Year.	Tons.
1875.....	33,501	1879.....	85,745
1876.....	81,830	1880.....	100,046
1877.....	73,222	1881.....	110,099
1878.....	72,098	1882.....	73,834

We give the following analysis of three samples, from the Pennsylvania Geological Survey Report of 1875 :

Water.....	1.130	1.300	1.170
Volatile matter.....	33.090	39.830	35.440
Fixed Carbon.....	53.006	52.063	43.992
Sulphur.....	1.874	1.727	1.708
Ash.....	10.900	5.080	17,690

The Bradford branch of the 'Erie' railway runs into the central portion of this county, and there is a small tonnage originating on this line. We have the report of the Butts mines located at Alton and operated by J. E. Butts, Jr. The annual product is about 25,000 tons. The tonnage produced since the opening of the mines to the end of 1882 was 210,000 tons in all.

## SNOW SHOE REGION.

This region is located in Centre county, Pennsylvania. It covers an area of about eight miles in length, and some four miles in breadth, and is situated on both sides of Beech Creek. The coal finds an outlet to market, via the Bellefonte and Snow Shoe, and Bald Eagle Valley connections of the Pennsylvania Railroad. The distance from Snow Shoe to Tyrone, (on the main line,) is 47 miles. The colliery at Snow Shoe, and the railway, were opened up in 1862, and were operated by the Bellefonte and Snow Shoe Railroad Company, until January, 1881, when the Pennsylvania Railroad Company secured the mines and railroad, by purchase, and a company was organized to mine coal and make coke, and the business for 1882, was 233,708 tons of coal, and 20,767 tons of coke, shipped over the Pennsylvania Railroad. Berwind, White & Co. are the tide-water representatives for this coal, and they report having made a trade by rail into New York and New England, for which this district has special geographical and railway facilities. We append details for years preceding :

Year.	Tons.	Year.	Tons.
1873.....	95,257	1878.....	29,168
1874.....	63,540	1879.....	56,654
1875.....	62,426	1880.....	56,020
1876.....	51,399	1881.....	128,263
1877.....	42,985	1882.....	233,708

The New Beech Creek, Clearfield and Southwestern railroad will open up other portions of the coal territory in this district ; some heavy transactions in land being reported in the interest of some of the projectors of this line.

## MYERSDALE REGION.

The principal operations in Somerset County, Pa., are as below, with headquarters at Myersdale :

Cumberland & Elk Lick .....	Shaw, Chamberlain & Co.
Cumberland .....	Thos. Williams.
Keystone .....	Keystone Coal Co.
Hersh .....	J. K. Hoblitzell.
Salisbury .....	Thos. Williams.
Tub Run .....	W. J. Smith & Co.
Salisbury Central .....	Balt. & Cumb. Coal Co.
Hoffman .....	Hoffman & Co.
Philson Iron Coal Co .....	S. Philson & Sons.
Berlin .....	R. D. Morgan & Co.
Buffalo Creek .....	Swede I. & C. Co.
Myersdale .....	Myersdale Coal Co.

There is a good quality of coal mined in this district, and as it is claimed to be an extension of the same seam as that found along George's Creek, it is often sent to market as 'Cumberland' coal. An analysis made by the Chemist of the Geological Survey shows, 1.665 water ; 22.350 volatile matter ; 68.774 fixed carbon ; 1.246 sulphur ; ash, 5.965. Coke per cent., 75.985. Color of ash, gray, with pink tinge. There was a good season last year owing to the long idleness of the mines in Maryland, and the output for 1882 has been estimated at 250,000 tons, but we fear this amount will not be done this year. Wages are only forty cents per ton, but the controlling power throws the trade into the hands of 'Cumberland' operators.



## THE CUMBERLAND REGION.

The Cumberland (George's Creek) coal field, located in Allegheny county, at the western extremity of the State of Maryland, supplies an important proportion of the semi-Bituminous coal reaching the seaboard markets. The connections with the tide-water markets are (1) via the Baltimore and Ohio Railroad, from the town of Cumberland 178 miles, and Piedmont, 206 miles west from Baltimore. (2) The Chesapeake and Ohio Canal, from Cumberland to Georgetown, 184 miles, and Alexandria 191 miles. The boats carry 110 tons, and make the trip in four or five days. The canal is owned by the State of Maryland, and is managed by a Board of Public Works. (3) The Pennsylvania State Line Branch, which taps the Cumberland and Pennsylvania Railroad near Mt. Savage (this gives an outlet to the Pennsylvania Railroad and its connections, for South Amboy, N. J.) The George's Creek and Cumberland Railroad, from the mines of the Maryland and American Coal Companies near Lonaconing, to Cumberland, thence by canal; and to the Pennsylvania Railroad. The West Virginia Central Railroad develops the territory south of the B. & O. road, and joins that line at Piedmont W. Va., and the coal is sold as Cumberland coal. In the first instance, all the coal produced in this district passes over the several routes named, and the tonnage last year was as below:—

Cumberland & Pennsylvania Railroad.....	1,058,942 tons.
George's Creek & Cumberland Railroad.....	203,595 tons.
West Virginia Central Railroad.....	256,150 tons.
Mined on line of B. & O. Railroad.....	20,479 tons.

It is then delivered to the following for delivery to various Markets east and west.

Baltimore & Ohio Railroad.....	1,024,423 tons.
Chesapeake & Ohio Canal.....	269,782 tons.
Pennsylvania Railroad.....	185,435 tons.
Local Trade.....	60,826 tons.

Baltimore and Ohio Railroad began carrying this coal in 1842; the Chesapeake and Ohio Canal in 1850; the Pennsylvania State Line Branch in 1872; the George's Creek and Cumberland in August, 1881; the West Virginia Central in October, 1881. We recapitulate the tonnage of the ten years past, to show the fluctuations of trade.

Year.	B. & O.	C. & O.	P. S. L.	Total.
1873.....	1,780,710	778,802	114,589	2,674,101
1874.....	1,576,160	767,064	67,671	2,410,895
1875.....	1,302,237	879,838	160,698	2,342,778
1876.....	1,070,775	632,410	131,866	1,835,081
1877.....	818,450	584,996	170,884	1,574,339
1878.....	924,254	609,204	145,864	1,679,322
1879.....	1,075,198	501,247	151,264	1,730,709
1880.....	1,319,589	603,125	213,460	2,136,160
1881.....	1,478,502	504,818	278,598	2,261,918
1882.....	1,085,249	269,782	185,435	1,540,466

The total business since the beginning, in 1845, to the end of 1882, foots up 41,439,452 tons, divided as below :

Baltimore and Ohio Railroad.....	26,622,700 tons.
Chesapeake and Ohio Canal.....	13,171,416 tons.
Pennsylvania Railroad.....	1,645,336 tons.

There was a local trade of 60,826 tons in 1882, and the Baltimore & Ohio Company used 77,468 tons on locomotives, in rolling mills, etc.

A trade in this coal to points in the west, has been developed, and it is estimated that fully 120,000 tons went in this direction, as a superior blacksmith coal compared with the cheaper coals found in the western states and territories.

The actual production by each company operating in the region, was as below :

Companies.	Tons, 1880.	Tons, 1881.	Tons, 1882.
Consolidation Coal Company.....	568,244	753,900	421,471
New Central Coal Company.....	355,455	303,618	168,883
George's Creek Coal and Iron Company.	236,435	256,061	148,602
Maryland Union Coal Company.....	153,359	173,178	99,566
Borden Mining Company.....	159,374	165,448	74,435
Maryland Coal Company.....	113,993	123,677	97,778
American Coal Company.....	125,434	121,505	92,771
Potomac Coal Company.....	77,694	81,120	48,098
Davis Bros., West Virginia Mines.....	54,843	69,063	2,585
Hampshire and Baltimore Coal Company	99,032	63,132	32,408
Atlantic and George's Creek Coal Co....	65,842	59,645	29,806
Swanton Mining Company.....	42,124	42,745	28,420
Blæen Avon Coal Company.....	45,020	25,295	7,291
West Va. Central and Pittsb'gh R. R. Co	.....	11,256	227,335
Piedmont Coal and Iron Company.....	14,591	8,453	19,194
Union Mining Company.....	4,470	3,822	5,397
Big Vein Coal Company.....	.....	.....	28,775
Totals.....	2,136,160	2,261,918	1,540,466

During the year 1882, the production of coal was largely decreased in the mines along George's Creek, from the strike that ensued upon a reduction in the price for digging, from 65 to 50 cents per ton. It began on March 15th, and continued until the 24th of August. The operators were successful, and not alone secured the reduction spoken of, but the power of the labor organization in controlling the amount produced, has been crushed. Labor in this region has always been well remunerated and there was no reduction in the price of mining the coal, from 1866 up to 1877 ; while on the other hand, the price of coal at the shipping points fell off about one-half within that period of time. We append a few statistics in this connection, showing the changes that have occurred :

1855—June, 35 cents. at which rate it remained until August, when it was reduced to 30 cents.

1856—January, to May, 1862, 30 cents.

1862—In June advanced to 40 cents, and in September to 45 cents.

1863—January, to March, 1864, 50 cents.

1864—In April, advanced to 60 cents, and in June to 75 cents.

1864—September, to May, 1865, \$1.00.

1865—In June, reduced to 75 cents, at which it continued to May, 1866.

1866—May reduced to 65 cents.

1877—In January reduced to 50 cents, advanced in August to 55 cents.

1878—March, 40 cents, at which it continued until October 15, 1879.

1879—October 50 cents, at which rate till February, 1880.

1880—February, advanced to 65 cents, at which rate till March 15, 1882. Then strike until August 24th.

1882—August 24th, 50 cents.

As a matter of course, the trade in this variety of coal was much hampered, the best part of the year for business being lost. It is expected that there will be a large tonnage during 1883. Prices have been as below, at Baltimore :

Year.	Prices.	Year.	Prices.	Year.	Prices.
1871.....	\$1 54	1875.....	\$4 35	1879.....	\$2 75
1872.....	4 52	1876.....	3 87	1880.....	3 75
1873.....	4 88	1877.....	3 15	1881.....	3 75
1874.....	4 70	1878.....	2 86	1882.....	3 50

From State line to Philadelphia is 298 miles ; to South Amboy, 365 miles.

## • WEST BRANCH REGION.

We include in this region the several collieries located in Cameron and Elk Counties, Pa., along the line of the Philadelphia and Erie Railroad. They are as below:

Collieries.	Location.	Operators.	Tons 1881.	Tons 1882.
St. Mary's mines,.....	St. Mary's,...	St. Mary's Coal Co.,.....	85,000	95,000
Daguschahonda mines,...	Dagus City,...	Northwest'n Min. & Ex. Co.	234,358	260,000
Enreka mines,.....	Kersey,.....	D. Eldridge,.....	40,000	45,000
Cameron mines,.....	Cameron,...	Cameron Coal Co.,.....	40,000	30,000

The coal from the Northwestern M. & E. Co. goes to the 'Erie' railway for supply coal, and this accounts for the large increase in the output. There will be new coal developments in this region before many seasons from the increase in the railway facilities ; the R. & P. and the 'Erie' extension, will open up a large territory heretofore without an outlet.

## NORTH PENNSYLVANIA SEMI-BITUMINOUS COAL FIELD.

In Bradford, Lycoming and Tioga counties, Pennsylvania, is found a superior quality of semi-bituminous coal that has been worked for many years, and disposed of to the railways of New York State, to rolling mills and for blacksmithing purposes, with the best possible results, as to its economic use for the several purposes named. We have in this coal field, the Blossburg McIntyre and Barclay districts. The first coal was sent to market from the Blossburg district (the Bloss mines), in 1840. The shipments by the several companies operating in this district in 1882, amounted to 1,757,562 tons, divided as below

Blossburg Coal Company.....	590,929 tons.
Morris Run Coal Mining Company.....	254,812 tons.
Fall Brook Coal Company.....	419,863 tons.
McIntyre Coal Co.....	209,858 tons.
Schrader Coal Company.....	156,956 tons.
Towanda Coal Company.....	210,917 tons.
Long Valley Coal Company.....	27,433 tons.
Fall Creek Coal Company.....	2,770 tons.

The business done by the several companies operating in the Blossburg District since the opening of the mines, in the year 1840, has been as below :

Arden Coal Company, 1844-45.....	49,623 net tons.
Wm. H. Mallory, 1844-57.....	405,113 net tons.
D. S. Magee, 1856-59.....	78,996 net tons.
Tioga Transportation Company.....	323,174 net tons.
Salt Company of Otsego, 1863-66.....	367,806 net tons.
Morris Run Coal Company, 1864-82.....	5,246,441 net tons.
Fall Brook Coal Company, 1860-82.....	5,087,435 net tons.
Blossburg Coal Company, 1866-82.....	3,569,500 net tons.

Total production of the district.....15,177,903 net tons.

Production of the Blossburg district, during the years named :

Year.	Tons.	Year.	Tons.
1872.....	849,262	1878.....	652,597
1873.....	991,057	1879.....	874,010
1874.....	796,388	1880.....	921,555
1875.....	531,782	1881.....	1,178,581
1876.....	616,984	1882.....	1,165,604
1877.....	602,245		

Blossburg Coal Co.'s output goes largely to the New York, Lake Erie and Western R.R. Co. for supply coal, as the railway company own the coal company. The N.Y. Central own half the Morris Run, and get a portion of the output for railway uses. Connection is made with the 'Erie' at Corning and Elmira, and with the N. Y. Central at Syracuse, at Geneva and at Lyons.

Superior coke is made by the Blossburg Company; two hundred ovens are already erected, and others are to be built. All the coal to be coked is washed in the largest coal washing apparatus in the State at the mines near Arnot.



At Ralston, in Lycoming county, Pa., on the line of the Northern Central Railway, (54 miles south from Elmira, N. Y.) are the mines of the McIntyre Coal Company. The coal is of the same general nature as that of the companies noted above. The company began operations in the year 1870, and 17,802 tons were shipped in that year:

Year.	Tons.	Year.	Tons.
1871. . . . .	106,138	1877. . . . .	183,715
1872. . . . .	171,420	1878. . . . .	154,205
1873. . . . .	212,462	1879. . . . .	127,632
1874. . . . .	138,907	1880. . . . .	216,225
1875. . . . .	164,507	1881. . . . .	236,922
1876. . . . .	208,701	1882. . . . .	209,858

Tonnage fell off last year owing to an accident, and long delay in resuming. Output in 1883, expected to be larger. The company owns a large area of fine coal lands.

In Bradford county are the mines of the Towanda Coal Company, the Schræder Coal Company, and the Long Valley Coal Company. The Barclay Coal Company are now the owners of all the coal area in the Barclay district, (excepting the Schræder) and lease the mines and railroads to the "Towanda" and "Long Valley" Companies. The railway connection from Towanda, is by the Pennsylvania and New York Railroad north to the 'Erie' at Waverly; the Southern Central, and the Geneva, Ithaca and Sayre at Sayre; south to the Lehigh Valley Railroad. We append details of the tonnage to this district.

#### THE SCHRÆDER COAL COMPANY.

Year.	Tons.	Year.	Tons.
1874. . . . .	100,219	1879. . . . .	144,946
1875. . . . .	157,686	1880. . . . .	216,802
1876. . . . .	200,795	1881. . . . .	210,654
1877. . . . .	175,755	1882. . . . .	156,956
1878. . . . .	149,285		

The coal from this operation is sold mainly to the New York Central, to the Southern Central, and to the Geneva, Ithaca and Sayre Railroads.

#### THE TOWANDA COAL COMPANY.

Year.	Tons.	Year.	Tons.	Year.	Tons.
1865. . . . .	6,886	1871. . . . .	249,240	1877. . . . .	164,344
1866. . . . .	3,881	1872. . . . .	263,960	1878. . . . .	165,025
1867. . . . .	27,668	1873. . . . .	252,329	1879. . . . .	237,608
1868. . . . .	67,080	1874. . . . .	215,572	1880. . . . .	246,064
1869. . . . .	176,307	1875. . . . .	200,424	1881. . . . .	223,172
1870. . . . .	196,310	1876. . . . .	160,343	1882. . . . .	210,917

This coal goes to the 'Erie' Railway for supply coal to their engines, etc.

During the years 1856-1867, the Barclay Coal Company mined coal and the total business was 412,640 tons.

The Fall Creek Coal Company mined in the years 1865-1875, 524,516 tons.

## COAL TRADE OF THE PENNSYLVANIA RAILROAD.

District.	Tons, 1880.	Tons, 1881.	Tons, 1882.
East Broad Top.....	68,788	85,768	92,519
Huntingdon and Broad Top.....	114,898	150,388	186,003
Snow Shoe.....	56,020	128,263	232,698
Tyrone and Clearfield.....	1,718,957	2,382,621	2,789,165
Gallitzin and Mountain region.....	307,125	303,707	527,768
"    "    "    "    coke.....	60,477	99,046	110,356
West Pennsylvania Railroad.....	291,135	296,229	368,164
"    "    "    "    coke.....	79,114	124,471	117,945
Southwest Pennsylvania Railroad.....	43,039	29,548	112,685
"    "    "    "    coke.....	1,149,389	1,421,883	1,805,362
Westmoreland region.....	943,177	982,293	1,274,116
"    "    "    "    coke.....	138,803	205,766	267,406
Pittsburgh region.....	561,548	689,483	646,348
"    "    "    "    coke.....	468,859	551,105	566,784

In addition to this, the Cumberland coal first carried by the H. & B. T. road 208,721 tons, and 1,824,720 tons of Anthracite ; there were also in 1882, 20,934 tons coke from Snow Shoe region. Total tonnage on this road, 8,268,357 *net* tons coal, and 2,888,787 *net* tons coke.

## STATISTICS OF BITUMINOUS AND SEMI-BITUMINOUS COAL PRODUCTION OF PENNSYLVANIA, IN 1882.

IN TONS OF 2,000 LBS.

Blossburg.....	1,165,604
Barclay.....	398,576
Mc Intyre.....	209,858
Total Northern Pennsylvania region.....	1,774,138
Broad Top.....	271,216
East Broad Top.....	148,696
Snow Shoe.....	232,698
Clearfield.....	2,898,970
Total Central Pennsylvania region.....	3,551,589
Allegheny Mountain.....	527,768
West Pennsylvania Railroad.....	368,124
Southwest Pennsylvania Railroad.....	112,685
Westmoreland.....	1,274,116
Pittsburgh.....	646,348
Johnstown Iron Works.....	775,000
Add for coke (2,888,787 tons) as coal.....	4,814,635
Total West Pennsylvania region, on P. R. R. ....	8,498,676
Total of above.....	13,824,394

In addition to this, Somerset county, 250,000, McKean county, 100,000, and the western counties of the State, sufficient to make the sum total 23,000,000 tons, including coal for making coke.

## BUFFALO, N. Y.

Buffalo is the most prominent of the Lake ports, as a coal shipping point; the tonnage is growing yearly into proportions which show that this city is bound to maintain its pre-eminent position. The varieties received here number all the Anthracite qualities, and the Reynoldsville, Fairmount, Cameron, Blossburg, McKean county, and other Bituminous coal. All the railways from western Pennsylvania coal fields tend to Buffalo as the shipping point upon the Lakes for this portion of their tonnage. The new line of the New York, Lackawanna and Western completed from Binghamton to Buffalo, last year, will no doubt be an important factor in the Anthracite coal trade of the west. The Reading line (Jersey Shore, Pine Creek and Buffalo) will be completed this year, and thus another important Anthracite interest will be enabled to market a portion of its product in the west. The Lehigh Valley Company is building an extensive system of docks and transfer facilities, and will increase its already large trade in this direction. Among the new lines developing Bituminous coal territory, is the extension of the Bradford branch of the 'Erie' road, into Jefferson county, Pa. It affords the shortest outlet to the markets reached from Buffalo, the distance from the mines to this city being only 119 miles. To show the progress in the coal trade of this city we annex the following tabular statement:

Year.	BLOSSBURG.		BITUMINOUS.		ANTHRACITE.	
	By Rail.	By Canal.	By Lake.	By Rail.	By Canal.	By Rail.
1873.....	80,000	125,000	87,724	190,000	255,044	479,855
1874.....	50,000	70,000	67,467	140,000	252,262	320,000
1875.....	75,000	45,000	32,767	350,000	250,206	500,000
1876.....	25,000	30,000	21,418	297,842	151,175	350,000
1877.....	50,000	10,000	44,247	214,200	209,609	550,000
1878.....	45,000	3,353	50,001	425,973	115,162	660,000
1879.....	60,000	2,000	36,648	637,022	92,134	1,000,300
1880.....	65,000	1,777	13,078	800,000	83,240	850,000
1881.....	65,000	500	7,860	923,919	181,292	1,075,000
1882.....	65,000	....	8,880	1,024,907	233,004	1,700,900

The shipments of coal by Lake and Rail are large, as the estimated consumption of coal for local uses is 60,000 tons Anthracite for manufacturing purposes, and 220,000 tons for domestic uses. Of Bituminous 650,000 tons for manufacturing, and 12,000 tons, for domestic uses. We give the exports of Anthracite coal by Lake, below:

1873.....	510,443 tons.	1878.....	306,172 tons.
1874.....	344,500 tons.	1879.....	550,646 tons.
1875.....	339,722 tons.	1880.....	554,670 tons.
1876.....	321,455 tons.	1881.....	825,240 tons.
1877.....	405,074 tons.	1882.....	995,500 tons.

Freights were 60 to 95 cents per ton, to Chicago, an average of about 50 cents per ton less than the preceding year.

Anthracite, F. O. B. opened at \$5.15 for Stove and closed at \$5.90. Transportation was \$2.69 to \$3.11 per ton from Coxton to Buffalo. Bituminous ranged from \$2.50 to \$4.25 per ton, as to quality.

The large steamers on the Lakes, like the Onoko 2700 tons, and the H. E. Packer 1700 tons capacity, must tend to keep freight low from this port.

The B. N. Y. & P. Railroad Company have made improvements at the mines, on the railroad and at Buffalo, and is now prepared to do a largely increased coal business.

The Rochester & Pittsburgh line reaches Du Bois, Pa., at a distance of only 121 miles from Salamanca, and coal can reach Buffalo cheaply over this line.

## NEW ORLEANS, LA.

The coal brought to this market is almost exclusively Pittsburgh coal. The flats and barges are towed by powerful tow-boats built expressly for that purpose. The towing between Pittsburgh and Louisville depends on the state of the river. When the stage of water is too low for navigation, which it frequently is for weeks, and even months, the supplies at the lower points become deficient, and prices naturally advance, often reaching very high prices. The coal flats and barges sent to New Orleans are generally dropped at Willow Grove, near Greenville, just above the city, where they are superintended for the owners or agents. When a boat or barge is wanted, a small city tug-boat is sent to tow it to the city, or to its destination on the coast. Messrs. C. A. Miltenberger & Co. give the following as the consumption of Pittsburgh coal:

Year.	Bbls.	Year.	Bbls.
1870.....	3,203,500	1877.....	3,014,200
1871.....	3,112,000	1878.....	2,999,600
1872.....	2,991,500	1879.....	2,421,100
1873.....	2,821,500	1880.....	3,187,400
1874.....	2,749,500	1881.....	3,627,100
1875.....	2,448,000	1882.....	3,284,000
1876.....	2,802,700		

The distance from Pittsburgh to New Orleans is some 2,000 miles, and the cost of towing say three and one-half cents per bushel, and this, in addition to the high cost at Pittsburgh, makes it necessary to have a better rate at the lower ports, than ruled last season to make the business profitable. The arrivals for the season ending with November, 1882, were 389 boats and 50 barges, and the consumption is put at 343 boats and 45 barges. Average price 32½ cents per barrel. Eleven barrels to a ton of 2,000 lbs., nearly. The coal sent to planters below the city is included in the consumption, while that left on the coast above is not considered. Of the 45 pieces consumed, designated as barges, five were French Creeks or small boats. Average contents—boats about 9,000 bbls.; barges 4,500 bbls.; French Creeks, 3,400 bbls.

There was also some 31 500 bbls. of coal from St. Bernard, Ky., by water and 19,408 tons of Alabama coal by rail. It was due to the large amount of Alabama coal, double that of any other year, that the prices were so low, and the market so unsatisfactory to all concerned. The decline in the consumption of Pittsburgh Coal is due to the reduced demand from Foreign Steamers, the number coming to this port being considerably less than the year before [this owing to the limited quantity of grain shipped via the Miss. Valley Route during the early part of the season], the displacement of over 200,000 bbls., by arrivals of that amount of Alabama Coal, and to the limited wants of families for house-warming purposes, the winter of 1881-82 having been exceedingly mild. On the other hand, the demand for steam manufactories, etc., is on the increase.

## PROVIDENCE, R. I.

The receipts of coal at this point, in tons of 2,240 lbs., in 1882, were 821,837 tons of all kinds. Details of receipts are as below:

Year.	Tons.	Year.	Tons.
1871.....	517,996	1877.....	613 295
1872.....	633,387	1878.....	530,767
1873.....	637,344	1879.....	712,973
1874.....	539,168	1880.....	687,552
1875.....	603,510	1881.....	788,604
1876.....	552,114	1882.....	821,837



## BOSTON, MASS.

The receipts are shown below :—

From	Tons 1879.	Tons 1880.	Tons 1881.	Tons 1882.
Alexandria, Virginia.....	19,457	27,149	20,356	2,444
Georgetown, District of Columbia.....	61,140	79,520	77,781	20,130
Philadelphia, Pennsylvania.....	805,679	767,940	814,433	1 005,083
Baltimore, Maryland.....	219,681	239,887	232,931	262,639
Other places (New York ports, etc.)	710,764	603,112	773,922	783,891
Great Britain.....	18,971	24,336	16,317	2,850
Nova Scotia.....	18,318	35,674	28,149	29,933
Total .....	1,845,010	1,777,648	1,963,399	2,106,870

It will be seen from the tabular statement above that the receipts are increasing ; manifestly there is a greater reliance upon steam as a motive power each year, throughout the eastern states. There was a large falling off in the receipts of Cumberland Coal by reason of the long strike in that district, which correspondingly inured to the benefit of the Clearfield operators. Shipments from Philadelphia include Anthracite, Gas and Bituminous coal. At Baltimore, Gas and Cumberland. There was a very fair tonnage from the Kanawha district placed in the eastern market last year. It will be noticed that the New York ports keep up their tonnage, quite equalling the business in Anthracite from Philadelphia, whereas five years ago, they did not amount to one half. It must be understood that the figures above, include the coal brought to this port for distribution to the interior as well as that for local consumption. Of the coal from Nova Scotia, a large proportion is culm to be used in connection with Anthracite dust, as a cheap fuel under steam boilers. The proportion of foreign coal of all kinds arriving, is not large, and is not likely to materially increase under any circumstances. In 1865, when the total receipts at Boston were 747,000 tons, there were 209,000 tons of foreign coal. In 1882, when the total is some 2,100,000 tons, there are but 31,000 tons. American Gas and Steam coals are superior and bring higher prices than the imported coals. Prices did not fluctuate very widely during the past year, and while coastwise freights were higher from all the shipping points to this city, the dealer and consumer had a fair market upon which to base calculations. The gross receipts for the past ten years, were as below :

Year.	Tons.	Year.	Tons.
1873.....	1,164,373	1878.....	1,343,887
1874.....	1,176,954	1879.....	1,845,010
1875.....	1,233,023	1880.....	1,777,648
1876.....	1,180,204	1881.....	1,963,399
1877.....	1,274,579	1882.....	2,106,870

## BROOKLYN, N. Y.

In the census year, ending May 31, 1880, it was reported that coal was used as below :

Anthracite by various manufactures.....	412,718 tons.
Public uses, not manufactures.....	103,929 tons.
Domestic consumption.....	800,900 tons.
Bituminous coal, various purposes.....	111,535 tons.
Gas coke sold for consumption 75,623 chaldrons.	

## BALTIMORE, MD.

The coal trade of this city increases year by year, and there is every probability of a larger business during 1883, than heretofore. We give a few statistics.

The shipments of Bituminous coal, foreign, were as below :

Year.	Tons.	Year.	Tons.
1872.....	54,363	1878.....	32,804
1873.....	59,546	1879.....	28,059
1874.....	70,675	1880.....	52,356
1875.....	33,460	1881.....	38,020
1876.....	27,336	1882.....	55,167
1877.....	27,189		

The Northern Central Railroad carried the following :

Year.	Tons.	Year.	Tons.
1872.....	244,757	1878.....	310,042
1873.....	242,754	1879.....	412,169
1874.....	232,938	1880.....	335,356
1875.....	276,784	1881.....	522,976
1876.....	263,954	1882.....	527,778
1877.....	343,936		

The Baltimore and Ohio carried the following Bituminous to Locust Point :

Year.	Tons.	Year.	Tons.
1875.....	1,460,874	1879.....	1,218,257
1876.....	1,141,689	1880.....	1,607,185
1877.....	966,668	1881.....	1,725,246
1878.....	1,087,785	1882.....	1,599,939

Coal to Locust Point includes gas coal from West Virginia mines on line of B. & O. road, and that from Youghiogheny mines in Pennsylvania on line of the same road, for local use and for northern shipment, and the estimate of 500,000 tons is a very correct one. There were 1,046,709 tons of 'Cumberland' coal received per B. & O. road, and 20,701 tons per Western Maryland, having been received on that line, at Williamsport, Md., from the C. & O. Canal. The demand for Cumberland was brisk, and there was an active shipping season after the resumption of work in the mines. There was a very fine opportunity for the Clearfield coal to enter the trade usually supplied at this point, from the Northern Central docks at Canton, where new piers and extensive improvements were made last year. The tonnage was perhaps 350,000 tons of Clearfield at this city.

Of the Anthracite coal received there were 9,258 tons per P. W. & B. road, and something like 100,000 tons per Susquehanna Canal, and other water routes, beside the coal by Northern Central Railroad. The shipment of coal in return box cars of B. & O. at Locust Point has been continued during the past season.

By the annual report of the Baltimore & Ohio Railroad Company, for the year ending with September last, it appears that notwithstanding the long strike in the George's Creek region, there was an increase in the coal tonnage of the company of 1,107,389 tons.

	Tons, 1882.	Tons, 1881.
Pittsburgh Division.....	2,477,749	1,980,102
Ohio Lines.....	678,041	378,917
Main stem .....	2,521,226	2,180,608

Pittsburgh tonnage includes coke, which has doubtless formed the largest portion of the increase.

## TOLEDO, OHIO.

The coal trade at this city has grown very much within the past year or two, for we find that while the receipts were 100,000 tons in 1873, they had grown to 441,212 tons in 1880, to 709,702 tons in 1881, and 1,782,810 tons in 1882. It is almost altogether the bituminous coal from Ohio's practically inexhaustible fields, and it is not too much to predict that there will be a business of 3,000,000 tons done in 1883. The details of the receipts were as below :

By Columbus & Toledo Railroad.....	835,608 tons.
By Ohio Central Railroad.....	480,378 tons.
By L. S. & M. S. Railroad.....	322,330 tons.
By Lake.....	80,126 tons.
By Canada Southern Railroad.....	20,556 tons.

There were about 100,000 tons of this that were Anthracite coal. The shipments by Lake to foreign ports were 48,092 tons, and to domestic ports 350,000 tons, of which the Ohio Central did 200,000 tons and the C. & T. road 125,000 tons. Besides this, a large quantity of coal was taken out by propellers and tugs for steam purposes. The arrangements for shipping coal at the various wharves are very complete. Machinery and appliances of the most approved patterns have been placed in position, and at the Ohio Central and Columbus & Toledo wharves alone at least 6,000 tons can be put into vessels daily. The Wheeling & Lake Erie Road will do an extensive receiving and shipping trade during the coming year so that it is safe to say that fully 3,000,000 tons of coal will be brought here by the several routes in 1883. The Ohio Central Barge & Coal Co. has done much to develop a trade in the coal from this point to the Northwest, and nearly 100,000 tons were taken to Duluth last season.

## ERIE, PENNA.

There is a business done in coal at this city of 700,000 tons annually. The local consumption amounts to 240,000 tons, and the remainder is forwarded West, by rail and vessels, from this city. The following details of the trade for 1881, will serve to show the course of trade :

Carried by.	Anthracite.	Bituminous.
Philadelphia and Erie Railroad.....	280,590 tons.	55,228 tons.
Erie and Pittsburgh Railroad.....	—	175,616 tons.
L. S. & M. S. R. R.....	—	200,000 tons.

## SHIPMENTS.

By Lake.....	95,235 tons.	112,467 tons.
By Rail.....	152,969 tons.	117,830 tons.
Erie local use.....	32,286 tons.	200,547 tons.

The shipments by Lake have been as below :

Year.	Tons.	Year.	Tons.
1870.....	312,081	1876.....	233,012
1871.....	377,457	1877.....	232,326
1872.....	350,159	1878.....	224,553
1873.....	325,711	1879.....	271,535
1874.....	217,500	1880.....	200,298
1875.....	174,672	1881.....	207,702

## CINCINNATI, OHIO.

The coal received at this city includes Youghiogheny; Ashland, Ky.; the Pomeroy from the vicinity of Pomeroy, Ohio; Hocking Valley, Ohio; Muskingum Valley, Ohio; Ohio river; the Kanawha from West Virginia, including the Splint, Bituminous and Cannel, and the Anthracite from Pennsylvania. The years end with August :

Year.	Net tons.	Year.	Net tons.
1854.....	302,148	1869.....	944,444
1855.....	383,555	1870.....	1,122,222
1856.....	277,777	1871.....	850,814
1857.....	537,037	1872.....	1,140,399
1858.....	555,555	1873.....	1,010,018
1859.....	458,988	1874.....	1,305,285
1860.....	540,740	1875.....	1,311,488
1861.....	462,962	1876.....	1,489,108
1862.....	314,814	1877.....	1,468,619
1863.....	296,296	1878.....	1,441,754
1864.....	591,680	1879.....	1,269,339
1865.....	609,889	1880.....	1,787,230
1866.....	667,514	1881.....	1,492,817
1867.....	683,195	1882.....	2,197,467
1868.....	648,148		

Pittsburgh coal, afloat, averaged 8.78 cents per bushel for last year, and Anthracite was sold, *delivered*, at an average of \$8.21 per ton.

The shipments of coal from the city to interior points footed up some 380,074 tons, so that the coal retained for consumption was 1,817,333 tons. The relative proportions of the several varieties were : Pittsburgh 63.8 per cent. ; Kanawha river 23.7 per cent. ; Ohio river 6.3 per cent. Anthracite footed up 31,197 tons, as against 30,821 tons in 1881. Coke sells largely, and the receipts were 3,671,050 bushels, not including 2,371,250 bushels made at the Cincinnati and Covington gas works.

Larger quantities of coal arrived from both the Pittsburgh and Kanawha regions than ever before, while to the rail facilities have been added the Cincinnati Northern Railroad and its connections, by which considerable supplies have come from the Ohio River region. While the year was favorable to the retail dealers, to the wholesale men it has been an unprofitable season. The average price in the past year for Campbell's Creek, both afloat and delivered, was practically the same with Pittsburgh, the only difference having arisen from the earlier arrivals of the former, which, at the high prices, slightly affected the averages at wholesale. The comparison, at retail, between the two years, for Campbell's Creek, would be as follows: 1881-82, 14.47 cents; 1880-81, 14.87 cents per bushel. The quotation for Ohio River, afloat, was 7.30 cents, in comparison with 7.85 cents in the previous year; and for coal delivered, 12.25 cents, in comparison with 12.36 cents. The average for Hocking and Muskingum Valley coal, delivered, was 12.47 cents, in comparison with 13.55 cents in 1880-81 ; Raymond City, delivered, 13.47 cents, compared with 13.97 cents ; and Cannel, delivered, 21.84 cents, in comparison with 22.88 cents.



## ST. LOUIS, MO.

The coal tonnage of this city is increasing at a very rapid rate ; taking coal and coke, there was about twice as much received in 1882, as during the year 1872. By far the largest proportion of the Bituminous received at this city is from the Belleville district, in St. Clair county, Illinois. The principal seam worked is five to seven feet in thickness, and it is economically mined. Analysis of this coal shows—water, 6 ; volatile matter, 38.8 ; fixed carbon, 52.2 ; ash, 5.

Mr. George H. Morgan sends us the following statement of the receipts of coal at St. Louis, for the year 1882, with a comparison from 1872 :—

By Ohio and Mississippi Railroad.....	4,550,300 bushels.
By Indiana and St. Louis Railroad.....	2,774,825 bushels.
By St. Louis, Vandalia and T. H. Railroad.....	7,660,175 bushels.
By Cairo Short Line Railroad.....	9,566,275 bushels.
By Wabash Railroad.....	3,849,700 bushels.
By Louisville and Nashville Railroad.....	6,253,225 bushels.
By Illinois and St. Louis Railroad.....	6,850,775 bushels.
By Cairo and St. Louis Railroad.....	2,717,900 bushels.
From Ohio River, (Pittsburgh).....	1,662,500 bushels.
From St. Louis county—estimated.....	650,000 bushels.
By St. Louis, Alton and Chicago Railroad.....	312,325 bushels.
From Grand Tower.....	711,075 bushels.
By Iron Mountain Railroad.....	183,300 bushels.
<b>Total .....</b>	<b>47,750,375 bushels.</b>

Twenty-five bushels of eighty pounds each to the ton of 2,000 lbs., gives a total of 1,910,015 tons.

The receipts of coke which is not in above account, amounted in 1882, to 261,732 tons. A recapitulation of the coal trade is given below :—

Year.	Bushels.	Year.	Bushels.
1872.....	24,557,425	1878.....	32,087,300
1873.....	32,608,795	1879.....	36,978,150
1874.....	29,823,050	1880.....	41,892,356
1875.....	32,466,650	1881.....	44,720,175
1876.....	32,073,125	1882.....	47,750,375
1877.....	35,856,850		

The quantity of Anthracite dealt in at this city, is stated to have been 60,000 tons during last year. The coke is mainly from the Carbondale Coal and Coke Company, ovens in Illinois, and it sells largely in place of Connellsville. Much complaint is made of the high rates of tolls and charges by the railway companies, on coal coming to this city; the cost to the manufacturer in St. Louis, under the most favorable circumstances and lowest contracts is 8 cents or over ; while it is usually about 10 cents ; as against 6½ cents at Pittsburgh for coal that is from 25 to 40 per cent. better. In other words, coal actually costs the manufacturer on the St. Louis side of the river double what it costs the Pittsburgh manufacturer.

LOUISVILLE, KY.

The average yearly consumption of coal at this point is some 750,000 tons. There is a coal trade of an equal amount, for the quantity received from Pittsburgh and forwarded to Southern ports all pays some tribute to this city. The following is the statistical statement :

Arrivals.....	617 boats.	1274 barges.	443 Nut.	109 Coke.
Shipments.....	617 boats.	355 barges.	138 Nut.	57 Coke.

Ohio River coal 114 boats. Kentucky coal by rail 8,306 cars with 110,469 tons. Anthracite by rail 467 cars with 6,538 tons.

Recapitulation of consumption during 1882, in tons :

COAL.		COKE.	
Pittsburgh.....	579,500	Connellsville....	34,000
Ohio River.....	57,000	City made.....	8,000
Kentucky.....	102,600	Gas company.....	15,800
Anthracite.....	4,825		

Pittsburgh shippers claim that coal was worth seven cents a bushel to start with, and that towing to Louisville cost two cents a bushel, and yet coal was offered at nine cents a bushel, or \$2.37 a ton, and Ohio river and Kentucky coal at two cents a bushel less. Anthracite sold at \$8.50 a ton.

MOBILE, ALABAMA.

Receipts are increasing each year, as the comparative statistics show, and the coal from the State is gradually displacing all other qualities. Prices retail last year were: Anthracite \$8 to \$9; Alabama \$6 to \$8; Pittsburgh \$8 to \$9, per net ton.

	1882.	1881.	1880.	1879.	1878.	1877.
Tons, Alabama coal.....	22,712	8,924	5,396	3,015	1,349	1,466
Tons, Pennsylvania & English coal	1,101	2,701	1,033	3,352	2,689	8,069

There is a gradual shipping trade being developed from this port ; six thousand tons were sent to Galveston last year. Demand good for all that arrives; all the U. S. Revenue steamers stationed in the Gulf, coal with Alabama coal furnished at this port.

RICHMOND, VA.

There were 2,500 tons Cumberland, and 46,867 tons Anthracite received at this port last year. Of the local coal there was perhaps 50,000 tons for all purposes, from Virginia mines, while the Chesapeake and Ohio delivered 116,536 tons for consumption besides 187,933 tons to the James River wharves for shipment. This last item is not so large as heretofore as the coal for shipment North and East goes forward to Newport News. There were 126,262 tons disposed of at the News last season.

Bridgeport, Conn ; say 250,000 tons in 1882.

New Haven, Conn ; say 775,000 tons in 1882.

## CHICAGO, ILL.

The total receipts of coal at Chicago have been :—

Year.	Tons.	Year.	Tons.
1871.....	1,081,472	1877.....	1,749,091
1872.....	1,398,024	1878.....	1,832,033
1873.....	1,668,257	1879.....	2,410,770
1874.....	1,359,496	1880.....	2,686,748
1875.....	1,641,488	1881.....	3,478,478
1876.....	1,619,033	1882.....	3,852,070

Lake shipments opened early, and the quantity of coal offering at Buffalo was not equal to the capacity of vessels offering and freights ruled low. Quotations were as below :—

April, 60 cents. May, 60 @ 65 cents. June, 70, 60, 65 cents. July, 70, 75, 80, cents. August, 85, 75, 85 cents. September, 85, 50, 60 cents. October, 65, 70, 75 cents. The season closed early in November with a few charters at 95 cents.

The receipts by Lake have been :—

ANTHRACITE.		BITUMINOUS.	
1870.....	340,730 tons.	1870.....	181,850 tons.
1872.....	495,765 tons.	1872.....	90,820 tons.
1873.....	538,837 tons.	1873.....	199,107 tons.
1874.....	395,680 tons.	1874.....	261,790 tons.
1875.....	518,971 tons.	1875.....	272,831 tons.
1876.....	362,373 tons.	1876.....	334,055 tons.
1877.....	442,325 tons.	1877.....	360,158 tons.
1878.....	325,553 tons.	1878.....	404,447 tons.
1879.....	464,876 tons.	1879.....	300,324 tons.
1880.....	419,823 tons.	1880.....	266,544 tons.
1881.....	565,161 tons.	1881.....	274,431 tons.
1882.....	699,579 tons.	1882.....	294,817 tons.

Anthracite was dull throughout the season owing to the stocks on hand at the opening and the free arrivals by rail and water, and prices were cut at all times to induce sales. The advancing circular rates were made to move off the coal sold the preceding month. Bituminous coals were in better request and the demand more steady ; the trade in coke is growing. Indiana and Illinois supply the bulk of the Bituminous coal sold and consumed, but Ohio is rapidly coming forward, while there was a large business in Pennsylvania and Cumberland coal last season.

The Statistics given below will indicate the growth of the coal trade at this city :

Receipts.	Tons 1879.	Tons 1880.	Tons 1881.	Tons 1882.
Anthracite by rail .....	375,715	359,458	538,698	397,435
Anthracite by lake.....	464,876	419,823	465,161	699,579
Bituminous by rail.....	1,266,576	1,640,923	2,090,188	2,460,239
Bituminous by lake.....	300,324	266,544	274,431	294,817
Re-shipments... ..	498,324	618,027	683,849	752,910

The Western Bituminous Coal Association reports that the receipts of Bituminous coal (including coke) were 2,856,243 tons during the year 1882.

## MILWAUKEE, WIS.

There were 250,000 tons Anthracite received at this city last year, and 75,000 tons Bituminous coal for local use. In addition there were 75,000 tons of coal of both varieties for the Rolling mills, and an equal amount for transfer to interior points by rail. Trade is constantly increasing and new companies are opening offices in this city so as to be able to divide up the trade West of this point; in fact some parties think that Milwaukee will rival Chicago as a coal *entrepot* before many years.

## DULUTH, MINN.

This city is becoming an important coal distributing point, for the Northwest: during last year: 264,688 tons of coal were received, of which at least two thirds was Anthracite coal. The Northern Pacific Railroad Company took 124,689 tons for distribution, and the St. Paul and Duluth railroad took 78,985 tons for distribution to interior points.

## PITTSBURGH, PA.

The bituminous coal field of Pennsylvania, which underlies a large portion of the State from which the manufacturing establishments of Pittsburgh draw their vast supplies, is estimated to contain about 14,000 square miles. The mere matter of area, however, cannot be considered as a measure of the value of a coal deposit, its essential elements being quality, thickness, regularity of its accessible veins and cheapness and facilities of transportation to market. The several counties of Allegheny, Westmoreland and Fayette send out twelve millions of tons of coal a year, and nearly all this pays tribute to the capital and brains that centre in Pittsburgh. Nearly all the mines located in this vicinity are what are termed drifts, and the mining and shipping entails but little expense to the proprietors, and hence this coal finds a market in such distant points at remarkably low rates. A division of the trade seldom noticed, is the special collieries for mills whose mines are contiguous; the coal being run into the yards of the mills from the mines. There are many railway lines centering here and ramifying the coal districts, and from all accounts there will be more before the close of another year.

There was a large increase in the shipments of coal by the Monongahela Navigation last year, and as a matter of course, labor was well employed, at 4 cents per bushel. The railroad mines were idle from April 1st, to August 15th, against a reduction from 4 to 3½ cents per bushel, and the miners finally accepted the reduction; the output of the railroad mines is about two million tons per annum. Selling rates of coal and wages paid appear on the following page. Coke was made more largely than ever, and the number of ovens is increasing, and yet the demand was always ahead of the supply; the weekly coke shipments averaged 65,000 tons. The Pittsburgh coal meets Kanawha and Ohio coal at Louisville and Cincinnati and yet the price is always higher for the first named coal, and the consumption does not materially decrease. At New Orleans it has met with competition from Alabama coal, and there has been a decrease. We give in their proper places the details of business at Louisville, Cincinnati, St. Louis, and New Orleans. Pittsburgh Gas Coal is almost supreme in its sway, cities of both east and west using it, for illuminating purposes.

There are 56 mines or pits on the railroads in this district; they employ 6,000 miners, or some 800 less than are employed in the 73 river pits. The railroad pits are gaining on the river pits and it is a fair average statement, to say that twenty-five per cent more coal is annually shipped by railroad than is credited to the Monongahela Navigation. In the railroad pits we include 16 on the Pan Handle; 16 on the B. & O.; 7 on the P., Va. & C.; 7 on the Sawmill Run; 6 on the Chartiers; 3 on the Pennsylvania and 2 on the P. & L. E. Railroad.



## PRICE OF COAL AT PITTSBURGH, PA.

PRICE OF COAL RUN OVER 1½-INCH SCREEN, F. O. B. CARS UNION YARD, PITTSBURGH, PA. THESE PRICES ARE FOR ONE HUNDRED BUSHELS, 76 LBS. PER BUSHEL.

Months.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.
January...A	\$9 50	\$8 00	\$5 50	\$5 50	\$3 00	\$5 75	\$5 00	\$6 75	\$7 00	\$7 50
February...	9 50	7 50	5 50	5 50	5 75	4 75	5 25	7 00	7 00	7 50
March.....	9 50	8 00	6 50	5 25	5 75	4 75	5 00	6 75	7 00	7 00
April.....	9 50	8 00	6 50	5 25	5 75	4 75	4 75	6 75	7 00	7 00
May.....	9 50	8 00	6 25	5 25	5 75	4 75	4 75	6 00	6 50	7 00
June.....	9 50	7 50	6 25	5 25	5 25	4 75	4 75	5 75	6 50	7 00
July.....	9 50	7 50	6 00	5 25	5 25	4 00	4 75	5 75	6 00	7 00
August....	9 50	7 50	6 00	5 25	5 75	4 00	4 75	5 75	6 00	6 50
September.	9 50	7 00	5 50	5 25	5 75	4 00	4 75	5 75	6 50	6 50
October....	9 50	7 00	5 50	5 25	5 75	4 25	5 50	6 25	7 40	6 50
November.	8 50	7 00	5 50	5 25	5 75	4 25	6 60	6 50	7 40	6 00
December.	8 50	6 50	5 50	4 75	5 75	4 25	6 00	6 50	7 25	6 00
Average...	9 33	7 46	5 87	5 25	5 60	4 52	5 15	6 29	6 79	6 79

General average for ten years is \$6.30. Average for last five years is \$5.91.

A—Price made by Railroad Coal Exchange for Nov., 1872, until Nov., 1873.

B—Price advanced on account of decision of Arbitrators.

C—Price until April 26th ; then reduced to \$6.00.

Above prices are for coal delivered in Individual cars only.

## PRICES PAID FOR MINING PITTSBURGH COAL.

PRICE OF COAL MINING ON RAILROADS ENTERING CITY OF PITTSBURGH, FOR COAL RUN OVER A 1½-INCH SCREEN. PER ONE HUNDRED BUSHELS, 76 LBS. PER BUSHEL.

Months.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	1882.
January...A	\$5 00	\$4 00	\$2 75	\$2 50	\$3 00	\$2 66	\$2 66	\$3 50	\$3 50	\$4 00
February...	5 00	4 00	2 50	2 50	3 00	2 66	2 66	3 50	3 50	4 00
March.....	5 00	4 00	3 00	2 50	2 50	2 66	2 50	3 50	3 50	4 00
April.....	5 00	4 00	3 00	2 50	2 50	2 50	2 28	3 50	3 50	D4 00
May.....	5 00	3 75	3 00	2 50	2 50	2 50	2 28	3 00	3 50	4 00
June.....	5 00	3 50	3 00	2 50	2 50	2 50	2 28	3 00	3 50	4 00
July.....	5 00	3 50	3 00	2 50	2 50	1 90	2 28	3 00	3 50	4 00
August....	4 00	3 50	3 00	2 50	3 00	1 90	2 28	3 00	3 50	3 50
September.	4 00	3 25	2 50	2 50	3 00	2 28	2 40	3 00	3 50	3 50
October....	4 00	3 00	2 50	2 50	3 00	2 28	2 75	3 50	4 00	3 50
November..	4 00	3 00	2 50	2 37	3 00	2 28	B3 50	3 50	4 00	3 50
December..	3 20	3 00	2 50	A2 00	3 00	2 28	3 00	3 50	4 00	3 50
Average...	4 51	3 55	2 77	2 45	2 79	2 36	2 57	3 29	3 62	3 80

Ranged from \$1.75 (in December, 1876) to \$5.00 (1872 and 1873).

A—Three prices this month, viz., \$1.75, \$2.00 and \$2.25—average, \$2.00.

B—Paid according to decision of Board of Arbitrators.

C—\$3.50 until April 26th ; then reduced to \$3.00.

D—Strike in all Pan Handle mines, from April 1st to August 15th against a reduction from \$4.00 to \$3.50. Miners accepted reduction.

General average for ten years, \$3.17—for last five years, \$3.13.

At mines that pay for the unscreened coal, the price is adjusted as follows : 8 cents per ton of 2,000 lbs. for each 50 cents per 100 bushels, of 1½ inch, screen coal.

## SAN FRANCISCO, CAL.

The statements given below will serve to indicate the consumption of the several varieties of coal at San Francisco. The principal sources of supply are from Mt. Diablo, in the immediate vicinity; from Coos Bay and Renton in Oregon; and Seattle in Washington Territory; from Vancouver's Island; from Australia and Great Britain; as also Cumberland and Anthracite, from the Atlantic coast. The domestic sources of supply furnish about one fourth of the sum total. The course of the coal trade at this point is governed by the amount of grain raised in the adjacent country. A heavy crop means an influx of vessels from Australia and Great Britain, and they bring coal as part of an inward cargo. From England there has been a falling off in 1882; from the coast collieries there has been a gain; also from Australia a gain of 36,931 tons. The reasons of these changes are easily explained; the decrease from England as against 1881 was caused by the marked and steady decline in outward grain freights, from month to month, for the past year, causing British vessels to seek other ports for employment; from Australia the increase has been brought about by a failure of the grain crop, leaving vessels there, and en route, no alternative but to come here seeking, some vessels accepting as low as 9 shillings per ton freight on coal from Sydney. The statement below shows the points from which the receipts were obtained.

	Qualities.	Tons 1880.	Tons 1881.	Tons 1882.
FOREIGN.	Australian.....	59,873	126,296	158,901
	English, Welsh and Scotch.....	66,660	281,313	188,771
	Vancouver.....	169,162	158,629	157,762
EASTERN.	Anthracite.....	19,629	13,697	24,996
	Cumberland.....	20,916	24,982	14,860
DOMESTIC.	Mount Diablo.....	158,723	103,055	113,255
	Coos Bay and Renton.....	35,415	21,246	14,533
	Seattle.....	123,741	152,893	154,611
	Carbon Hill.....			54,627

Total receipts during a series of years have been as below :—

Year.	Tons.	Year.	Tons.
1860.....	77,635	1872.....	434,467
1861.....	116,245	1873.....	454,582
1862.....	120,545	1874.....	531,947
1863.....	135,550	1875.....	538,209
1864.....	167,298	1876.....	648,388
1865.....	150,147	1877.....	576,760
1866.....	192,601	1878.....	626,834
1867.....	248,925	1879.....	618,519
1868.....	282,025	1880.....	654,118
1869.....	328,973	1881.....	899,680
1870.....	320,493	1882.....	882,896
1871.....	315,194		

The Oregon Coal and Navigation Company have erected at San Francisco, coal handling machinery and pockets after the eastern method, and the business will grow under the improved system of conducting it.

## CLEVELAND, OHIO.

The total receipts of coal at Cleveland, from 1828 to 1852, amounted to 662,862 tons; having increased from thirty tons in 1828 to 137,926 tons in 1852. We have no details from that date until 1865, but the following will serve to show the growth of the trade :

Year.	Tons.	Year.	Tons.
1865.....	465,550	1874.....	1,215,353
1866.....	583,407	1875.....	1,414,124
1867.....	668,026	1876.....	1,250,531
1868.....	759,104	1877.....	1,363,345
1869.....	922,757	1878.....	1,310,838
1870.....	904,600	1879.....	1,576,807
1871.....	1,165,940	1880.....	1,750,000
1872.....	1,348,160	1881.....	1,928,883
1873.....	1,599,212	1882.....	1,922,595

The receipts for 1882 are divided as below :

Bituminous coal by rail.....	1,422,595 tons.
Bituminous coal by canal.....	150,000 tons.
Bituminous coal at Newburgh (18th ward).....	350,000 tons.
	————— 1,922,595 tons.
Anthracite coal received.....	99,314 tons.

Lake shipments of Bituminous coal :—

	1878.	1879.	1880.	1881.	1882.
To ports in British Province...	61,869	46,174	60,527	31,497	50,000
To domestic ports.....	597,412	580,610	654,953	828,110	900,000

We find that trade has generally been very even and satisfactory in character throughout the year past ; the figures above given indicate the course of trade, and it will be seen that the local consumption of fuel for manufacturing and domestic uses was about one million two hundred thousand tons. We notice that 69,906 tons of Connellsville coke was received at this city last year.

The wholesale average prices of bituminous have been : Carbon Hill and Monday Creek, \$2.65 ; Massillon, \$2.75 to \$2.85 ; Brier Hill, \$3.25 to \$3.75 ; Salineville, \$2.25 ; Tuscarawas, \$2.25. Throughout the first six months, and even later, the coal companies were greatly incommoded by an insufficiency of coal cars. The year has been marked by intermittent strikes of miners, without result so far as the demanded increase of wages was concerned.

## KANSAS CITY, MO.

There were 420,731 tons of coal received at this city in 1882, which was quite an increase over the preceding year. The trade in Anthracite is growing, shipments being made to points in Kansas, Nebraska and Iowa, also some to Pueblo and Denver, Colorado. The 'Piedmont' coal from Cumberland district of Maryland has also been dealt in. Connellsville coke has been received in some quantity for foundry uses. There was a large increase in the amount of Rich Hill and Fort Scott coal. Manufactures, and the local trade is increasing, but the shipping of coal to distant points is also quite a business, having amounted to 161,779 tons last year, a gain of over 123,000 tons, as compared with 1881. The Rock Island road took 86,063 tons alone for distribution along its line. The Fort Scott extension from Cherryvale to Arcadia, opened up an extensive tract of very fine coal, which will seek a market here. Several new shafts have also been sunk at Cherokee and Fort Scott, largely increasing the outputs from those mines. One or two new shafts have also been sunk at Rich Hill. The mines north of the river have not been so busy, reporting but a slight increase in business over the year previous, while from Lexington there was a falling off in the supply of its coal upon this market. These coals, however, were largely consumed by the Gould railroads, the first part of the year, to the neglect of the general market. But as Mr. Gould now owns mines at Rich Hill, and the coal there being of superior quality to the Lexington, his railroads are now getting much of their supply from them, and the Lexington coals again entering more freely into the general market.

## MONTREAL, P. Q.

Anthracite coal continues to reach this city in increasing quantity, notwithstanding the duty of fifty cents per ton levied thereon, as the following figures will show :

	Tons 1881.	Tons 1882.
Anthracite from United States.....	135,549	176,886
Bituminous from Great Britain.....	58,468	25,060
Bituminous from Nova Scotia.....	135,000	170,000

## CITY OF QUEBEC.

We are enabled to give the following official statement of the coal receipts at this port :—

	Tons 1881.	Tons 1882.
Anthracite from United States.....	11,151	9,773
Bituminous from Great Britain.....	81,156	98,451
Bituminous from Nova Scotia.....	13,598	32,875



## PACIFIC COAST COALS.

The Mt. Diablo coal, which is mainly used for steam coal in San Francisco, and on the steamers of the bay, is of poor quality, and, owing to its sulphur, is disliked for domestic purposes.

The Coos Bay coal field covers several hundred miles of territory in Oregon, stretching from the Umpqua River, on the north, to points beyond the Coquille River, on the south, and extending back from the coast to from 15 to 20 miles interior. The country is covered with a heavy growth of timber. The coal to be mined at a profit must be of good quality, favorably situated for cheap mining, and very close to navigable waters.

The coal mines of Washington Territory are situated at Bellingham Bay, close to the British Columbia line, and in the vicinity of Seattle, on the eastern shore of Puget Sound. The Seattle coal field is one of the most important on the coast, and covers a large area. Some of the best coal on this coast comes from Vancouver's Island. The Wellington coal comes from there, and is considered a first-class coal.

We give below the shipments of Vancouver's Island coal. This island is located within the limits of the dominion of Canada. The coal area is estimated at 390 square miles. San Francisco receives a large percentage of the output.

Year.	Tons.	Year.	Tons.
1870.....	29,863	1876.....	140,087
1871.....	45,000	1877.....	154,052
1872.....	46,148	1878.....	190,640
1873.....	45,723	1879.....	228,974
1874.....	81,397	1880.....	282,128
1875.....	110,145	1881.....	325,000
Tons are stated as 2,240 lbs.		1882.....	330,000

In the report of the census, Washington Territory is credited with an output of 145,015 tons; this must be below the mark for something like 130,000 tons were shipped from Seattle to San Francisco. We append details of the shipments:—

Year.	Tons.	Year.	Tons.
1871.....	4,918	1877.....	104,556
1872.....	14,830	1878.....	128,582
1873.....	13,572	1879.....	132,224
1874.....	9,027	1880.....	138,497
1875.....	70,157	1881.....	147,418
1876.....	112,734	1882.....	154,611

The Mt. Diablo coal is sold to the extent of 100,000 tons annually, in San Francisco. We append details:—

Year.	Tons.	Year.	Tons.
1871.....	133,485	1877.....	96,172
1872.....	177,232	1878.....	122,034
1873.....	171,741	1879.....	134,435
1874.....	206,555	1880.....	158,723
1875.....	142,808	1881.....	103,055
1876.....	108,078	1882.....	113,255

Shipments at Tacoma were about 60,000 tons, of which 54,627 tons were received at San Francisco, in the year 1882. The business from Seattle and Tacoma, will no doubt largely increase this year.

We find the following analyses of Coos Bay and Astoria coals compared with the Nanaimo and Bellingham Bay:

	Astoria coals.	Coos Bay.	Nanaima.	Bellingham. Bay.
Water.....	2.56	20.00	2.98	8.39
Volatile matter.....	46.29	32.59	32.16	33.26
Fixed carbon.....	48.49	41.98	46.31	45.69
Ash.....	2.74	5.34	18.55	12.66

### COAL TRADE OF OHIO.

The census report for the year ending May 31, 1880, shows an output of coal within this State, of 6,008,595 tons. Mr. Andrew Roy, the inspector of mines, states that owing to the opening up of several new mining districts in the State, after the date of the census reports, the output for the year ending December 31, 1880, could not have been less than 7,000,000 tons. The coals of Ohio are all of the Bituminous variety, and are known by various and general names, as Block coal, Gas coal, Cannel coal, etc., and by many special names, as Mahoning Valley coal, Hocking Valley coal, Salinesville coal, etc., according to the localities from which they are drawn. The best furnace coal is the Block coal of the Mahoning Valley; the best coke is made from the coals at Leetonia and Washingtonville, in Columbia county; the best house coal is found in Jackson county; the best gas coal, so far as recent tests would seem to indicate, is the Barnesville coal, of Belmont county.

The Ohio coal field, which occupies nearly one-third the area of the State, and which, along the Ohio River from Bellaire to Pomeroy, attains a thickness of sixteen hundred feet, has been so recently opened, and so limited have been the subterranean excavations, that it is largely a matter of conjecture as to the causes, as well as the extent of many of the wants or intervals of barren ground. But that great areas of barren ground extend through many if not every one of the twenty or more different beds of coal of workable height known to exist in the State, is now generally acknowledged alike by geologists, mining engineers and practical men. A vast and invaluable amount of information in regard to the existence of wants in coal seams was brought to light by the late geological survey, particularly in the later volumes of the survey, for the first published reports were more hopeful than the later ones as to the amount of coal enclosed in the mineral strata of the State.

The steadiest of all the coal beds is No. 8 of the geological nomenclature—the Pittsburgh vein; next to this in steadiness, so far as developments would indicate, is the 'great vein' of the Hocking Valley—No. 6 of the geological reports. The least reliable coal, though one of the most valuable as regards quality and adaptibility to various uses, is the lower coal of the State series—No. 1, or the 'block coal' of the Mahoning Valley. This coal is mined extensively near Youngstown, Massillon and Akron, and is also opened and worked to a considerable extent around the village of Jackson, in Jackson county. It is everywhere found disposed in a wavy and uneven floor, being thickest in the low places or swamps of the mine, and growing gradually

thinner as it extends up the sides of the swamps or troughs, until it is either suddenly cut away by a fault, formed, in my judgment, by the shore waves of the ancient sea lashing the sides of the coal marsh, in the first stage of the subsidence of the land; or it bravely continues the ascent of the trough sides till it thins down to a feather edge.

The excess of the yield of coal in Ohio during 1882, as compared with 1881, was over one million tons. The total coal supply yet undeveloped is estimated at 85,000,000 tons, or at the present rate of consumption enough to last 400 years. As computed by the report of the Inspector of Mines, the annual coal product of Ohio doubles every ten years. At this rate, in 1892, the total production will have reached the enormous sum of 18,900,000 tons.

The coal production of the State, according to the most reliable information obtainable, for the year 1872 to the year 1882, inclusive, was as follows:

Year.	Tons.	Year.	Tons.
1872.....	5,315,294	1878.....	5,500,000
1873.....	5,450,028	1879.....	6,000,000
1874.....	3,267,585	1880.....	7,000,000
1875.....	4,864,259	1881.....	8,250,000
1876.....	3,500,000	1882.....	9,450,000
1877.....	5,250,000		

We give details of the coal trade of Cleveland, Cincinnati and Toledo in other portions of this work. Ashtabula is quite a coal shipping point; in addition to the Ohio coal received and shipped there, we notice that coal from Mercer county, Pa., is being brought by the Oil City and Chicago line for shipment.

### COAL MINING IN IOWA.

In preceding editions of this annual we gave the tonnage of the State of Iowa at figures that were thought to be above the mark. The census report for 1880 (year ending May 31st) shows that there had been an output of 1,461,116 tons, fully confirming our figures. For the calendar years 1880 and 1881, there was a large increase over these figures. Many of the operations are now upon a large scale, some operations having a capacity of 700 tons a day. Mining ranges from three to five cents per bushel, according to the thickness of the seam worked. Seams included in this schedule are from four to seven feet in thickness. Keokuk, Mahaska, Marion, Monroe, Wapello, Lucas, and Webster counties have coal ranging from five and a half to nine feet in thickness, whilst all the other coal producing counties, with the exception of the western portion of the State, have coal from three to four feet in thickness. The western portion of the State referred to, includes Page, Taylor, Adams and Cass counties, in which is being worked the surface vein. Beyond doubt, in a few years the State of Iowa will become a coal mining State of no small magnitude. A few years since the State was considered to have no coal to amount to anything. Within the limits of the Iowa coal fields there are thirty-eight counties, of which twenty are producing coal to a greater or less extent. The mining industry of the State has become one of considerable magnitude, and also a great source of wealth. The coal seams are being developed as rapidly as railroad transportation can be obtained; a great many new mines are being opened, and yet the prospecting goes on, and every indication leads to the belief that the State will double her present number of mines, as well as her mining population, in a few years. Mr. Park C. Wilson, the inspector of mines, reports that the total output of coal from the State of Iowa from July 1, 1881, to July 1, 1882, was 3,127,700 tons; average price per ton for mining, 90 cents, making the total earnings of 7,400 miners \$2,814,930, or \$31.66 per month per man.

## INDIANA COAL PRODUCTION.

The annual report of Mr. Thomas Wilson, Jr., State Mine Inspector of Indiana, makes the following statement of the coal product, capital invested and number of mines in the State for 1881 :

Counties.	No. of Mines.	No. of Men.	Coal in Tons.	Capital in Dollars.
Clay .....	35	2,256	921,288	\$558,408
Daviess.....	8	569	201,533	121,500
Dubois .....	1	25	6,910	6,000
Fountain.....	5	402	177,880	113,000
Knox .....	2	136	53,474	8,000
Owen .....	1	64	23,121	31,000
Parke .....	11	350	143,146	163,500
Pike .....	1	70	22,830	25,000
Perry .....	1	25	13,850	176,600
Sullivan.....	4	116	36,033	100,000
Spencer.....	1	10	4,400	3,000
Vermillion.....	2	52	13,537	8,000
Vigo .....	4	178	51,500	29,300
Vanderburgh .....	3	143	67,147	71,502
Warrick .....	7	171	34,947	24,400
Total.....	86	4,567	1,771,536	\$1,442,210

Referring to new coal fields, Mr. Wilson says the fields of Pike and adjoining counties will add considerably to the output during 1882. Pike and two or three adjoining counties are underlaid with two immense beds of coal, extending under the whole section of that country. The coal of this new district is not of the best quality, but will compare very favorably with other coals of the State. This region is crossed by the Louisville, Evansville and St. Louis road. We have the official statement that the output in 1882, was 1,976,470 tons produced at 214 mines, and valued at \$2,500,000.

## COAL IN KENTUCKY.

The greater portion of Kentucky, excepting only those strips of territory contiguous to the Louisville and Nashville, Cincinnati Southern, and a few other roads which have been in operation for some time, is essentially an undeveloped wilderness, but one which contains perhaps, greater possibilities than any other region of corresponding area in the United States. The State is divided naturally into three districts—eastern or mountainous, the central or blue grass, and the western or Green river. The eastern district contains a coal field over 10,000 square miles in area, which, with, the western field, gives the State a coal area of over 12,700 square miles, exceeding the area of the Pennsylvania coal fields, or the entire coal area of Great Britain and Ireland. This coal is mostly Bituminous, and is considered among the best known for manufacturing purposes. In addition to the Bituminous coal in the eastern district, there is also the largest area of Cannel coal in America. This coal is from three to four feet thick, and of superior quality. There was very little coal mining done in Kentucky before the war. In 1870 the total amount mined was stated in the census report for that year to be 150,580 tons, which, in 1875, was increased to 500,000 tons, and in 1882 to 1,260,300 tons. In the western field the most persistent and uniform



coal of the series is D, or No. 9 ; it is from four to six feet thick, averaging five feet. It is an excellent coal for grate and furnace, and gives a good coke. A lot of slack from this vein, from St. Bernard mines, Earlington, Ky., washed and coked, gave a bright, firm coke, with only one per cent. sulphur. There is also coal sent out via the Kentucky and Cumberland rivers and the Ohio, from Boyd and Lawrence counties, besides local use. We credit the eastern coal field with 500,000 tons for 1882.

Details of the production of the western coal field are given below :—

	Tons, 1880.	Tons, 1881.	Tons, 1882.
Mines on Henderson div. of L. & N.....	192,047	283,281	269,600
Mines on Paducah and Elizabethtown R. R. .	234,963	261,000	274,700
Mines on Green River.....	100,000	100,000	96,000
Mines on Ohio River, below Green River ....	82,000	80,000	60,000
Mines on Ohio River, above Green River .....	80,000	80,000	60,000
Grand Total.....	689,010	804,281	760,300

The Straight Creek Coal Company in Carter county is working the Colton seam, five feet in thickness in the eastern coal field. In Pulaski county, a company is operating quite largely a seam of 46 to 48 inches of good coal. The Mt. Sterling and the Lexington Mining Companies are also developing land in Carter county. The railways are becoming large carriers of coal, and they are tending to greatly enlarge its distribution ; this in turn tends to develop the coal resources of the State. In Greenup county are valuable coals for all purposes ; a few sample analyses are appended :—

Volatile matter.....	39.00	47.36	36.90	33.48
Fixed carbon... ..	56.00	50.64	58.30	60.52
Moisture .....	5.00	2.00	4.80	6.00

The first and fourth are valuable for steam, and the second and third are good Cannel coals. Prof. J. R. Proctor, State Geologist says : 'The Eastern Kentucky coal-fields are even superior to those of Western Kentucky, and are 10,000 square miles in extent. Coal is found in every county in a line between the Ohio River and the Tennessee State line. The thickness varies from twenty-four to fifty-four inches. In the northern part of this district are immense deposits of iron ore, and in close conjunction with coal beds. The completion of the Chesapeake and Ohio Railroad, with its connection, will afford greater advantages for the manufacture of iron than are possessed by the corresponding region beyond the Ohio River. In Bath County, and farther south, is the Red River car-wheel iron.'

The St. Bernard Coal Company is the largest individual enterprise in the State, and their output is three hundred thousand tons annually. They are using the Harrison coal-cutting machine and find that it works to great advantage.

## COAL IN TENNESSEE.

In this State the Appalachian coal field covers an area of 5,100 square miles, and includes within its limits the counties of Scott, Morgan, Cumberland, the greater parts of Fentress, Van Buren, Bledsoe, Grundy, Sequatchie and Marion, considerable parts of Claiborne, Campbell, Anderson, Rhea, Roane, Overton, Hamilton, Putnam, White and Franklin, and small portions of Warren and Coffee. In the last edition we prophesied a largely increased output during 1882, and the result of the year's busi-

ness proves the correctness of our remarks. We are informed by Mr. Henry E. Colton that the tonnage of coal mined in the State, was 857,879 tons, divided as below :—

Sewanee District.....	350,000 tons.	Poplar District.....	50,000 tons.
Coal Creek District...	199,500 tons.	Etna mines.....	30,379 tons.
Walden's Ridge Dist..	161,000 tons.	Sundry small mines....	2,000 tons.
Plateau District.....	65,000 tons.		

An increase of twenty-five per cent. may be looked for in the next year or two at least, for new mines are being opened in the Sparta region, and there will be a large increase in the mining of coal for the manufacture of coke. We give a few details of the output : Coal Creek district is served by the Knoxville and Ohio branch of the E. T., Va. and Ga. Railroad. Coal is carried to Knoxville for distribution. In the Poplar Creek district there is but one mine, that of the Oakdale Iron Company. They have a good narrow gauge road to their furnace, ten miles, and a poor continuation to the Cincinnati Southern. There are seven concerns expecting to operate in this district so soon as they can get respectable transportation facilities. In the Walden's Ridge district there are seven mines opened, but only three did much work in 1882. It is expected that a large increase will take place during this season, as this coal field has the best coking coal in Tennessee ; over two-thirds of the output last year was made into coke. In the Plateau district are the mines on the Cincinnati Southern Railroad, north of the divide between the Tennessee and the Cumberland. Part of the output could go to Cincinnati under fair rates of freight, and there is some trade done to points in Kentucky. In the Sewanee district are the extensive mines of the Tennessee, C. I. and R. R. Co., and they mined and shipped 144,893 tons coal, and made and sold 5,407,645 bushels of coke last year. The coke making business in Tennessee has made a wonderful increase. In 1870 there was one iron furnace using part coke and part raw coal, and making 15 to 20 tons of iron per day. They had 20 coke ovens. In 1883 there are seven stacks in blast, all using coke, and there are 866 coke ovens making furnace and foundry coke, and some coke is made in pits. Besides these, full 125 more ovens are being erected. The new Citico furnace at Chattanooga, which will be in blast by next November, will require 150 ovens to supply it with coke. Capitalists at Nashville are also looking into coal fields east of McMinnville and Sparta for a location for coke ovens, desiring to use the fuel in a furnace to be erected at Nashville. The Coal Creek coal has been tried for coke-making. The appearance of the coke is good, but it has not yet been tested in the blast furnace. Coke from the Poplar Creek coal has been used in the Oakdale furnace for over a year with the most perfect success.

We give analyses of coals as found in the report on the coal and iron of this State :—

	Fixed Carbon.	Volatile.	Ash.	Sulphur.	Water.
Coal Creek, Anderson Co.'s mine.....	57.52	38.82	3.09	.20	1.04
Coal Creek, Empire mine.....	57.69	37.80	2.55	....	....
Sewanee, Tenn. Coal and R. R. Co..	63.50	29.90	6.60	trace	....
Sewanee, Tenn. Coal and R. R. Co..	63.00	29.30	6.60	trace	....
Etna, Kelly seam.....	74.20	21.89	2.70	.70	1.30
Emery mines, Walden's Ridge ..	68.10	27.70	7.70	.53	1.50
Sharp's, beyond Careyville.....	64.32	31.15	2.31	....	2.22
Sewanee Coke.....	83.36	....	15.44	.14	1.06

## WYOMING AND UTAH.

The Union Pacific Railroad controls about all the coal mines and lines of transportation within the territories of Wyoming, Utah, Idaho and Montana, while Nevada, and even California, have to depend largely upon that corporation for much of their coal. The company have extensive mines at Carbon, Rock Springs, and Almy, in Wyoming, and also at Coalville and other places, in Utah, which are reached by branch lines.

There is a marked increase in the consumption or demand for coal. A new demand has sprung up by the opening and extension of the Utah and Northern road through Idaho, and into Montana. The only coal vein as yet opened north of the U. P. main line, is that of some croppings near Shinebergers's, forty miles south of Dillon ; and it has not yet come into market.

The coal lands owned by the Union Pacific Railroad Company extend along the line of the road from Carbon to Echo, a distance of 335 miles, and embrace an area greater than the entire Anthracite region of Pennsylvania. Previous to 1875, the mines were worked by contractors ; but since that time, the company has operated them on its own account. The results of working the principal localities, and the total figures are shown in the following table :

Year.	Carbon.	Rock Springs.	Almy.	Total Tons.
1875.....	61,750	104,667	41,885	208,222
1876.....	69,062	134,953	60,756	264,711
1877.....	74,343	146,494	54,643	275,480
1878.....	62,418	154,281	59,096	275,795
1879.....	75,325	193,251	71,576	340,152
1880.....	100,434	244,460	100,235	445,129
1881.....	156,820	279,908	110,157	546,885

There was also 40,608 tons mined at Grass Creek, at an average cost of \$2.19 per ton. Average for the three items in above table, was \$1.29. Of the coal produced, 193,032 tons was sold. The tonnage not sold was chiefly consumed by the company. The average receipt per ton was \$5.69. The average haul on the coal sold was 352 miles, an extremely long haul for coal. Deducting the average cost of mining, the average receipt on the coal sold was 1½ cents per ton per mile moved.

With reference to the lignite coals of our Territories, we are surprised at the uniformity of their character, as shown in a recent report of them by the Messrs. Sheafer, Mining Engineers, on the coals of Wyoming Territory. Their great purity is shown as follows :—

	Moisture.	Carbon.	Vol. Matter.	Ash.
Wyoming Territory.....	15.54	45.00	36.58	2.91
Mount Diablo, Cal .....	13.33	43.03	39.09	4.55
Washington Territory.....	8.39	45.69	33.26	12.66
Vancouvers.....	2.98	46.31	32.16	2.98
Montana.....	5.00	46.—	38.00	10.00

The Utah Central road carried 115,235 tons coal, and 45,283 tons coke in 1882. The shipments from the mines on line of Union Pacific road were 655,496 tons, of which 425,000 tons were for use of the company.



## ALABAMA COAL OUTPUT.

The census reports show that whereas 11,000 tons was the output in the census year ending in 1870, the quantity ten years later was 323,972 tons. The production is increasing rapidly of late years as the following schedule will show :—

Year.	Tons.	Year.	Tons.
1874.....	49,889	1879.....	290,000
1875.....	75,806	1880.....	340,000
1876.....	102,640	1881.....	400,000
1877.....	172,182	1882.....	800,000
1878.....	194,268		

By reference to a geological map of Alabama, it will be seen that the coal measures of the State are divided into three distinct fields, separated by long narrow valleys running northeast and southwest, in which the strata of formations older than the coal measures form the surface rocks. These three fields have been named by Prof. Tuomey, from the rivers that drain them, the Coosa, the Cahaba and the Warrior fields. The geological map will show also that the Warrior field itself is divided in several distinct parts by similar long and narrow valleys—Will'ss, Murphrees' and Brown's.

It is only of late years that coal mining in this State has been a profitable investment. This was, doubtless, owing to the fact that the country had not previously been opened by a railroad system, whereas three prominent roads now pass right through the heart of these formations. They are the Louisville & Nashville, the East Tennessee, Virginia & Georgia and the Alabama Great Southern. The scope of work has, consequently, widened, instead of confining itself to the rival banks, as was formerly the case. Six years ago the Louisville & Nashville road hauled only two thousand tons of Alabama coal. Now there are 2,750 tons mined each day in the Birmingham district alone. This coal is worth \$1.50 at the mines. The demand for Alabama coal is far in excess of the supply. Its introduction into New Orleans and other Southwestern markets has met with immense favor.

The Montevallo mine, located 2½ miles west of the town of that name, on the East Tennessee, Virginia & Georgia Railroad, has a wide guage road running from the main line to the mine, so that no further handling is required, prior to transportation, after the cars have once been loaded at the mine. Capacity 200 tons per diem. The Helena mines are three in number, and are situated at Helena, Shelby county. They have a daily capacity of 600 tons per diem. There are also one hundred coke ovens, with a capacity of 100 tons per diem, whose yield is devoted exclusively to the Oxmoor and Helena iron works. The Pratt mines are the largest in the State, and have a daily capacity of 1,900 tons. The vein is reached by means of a shaft and two slopes. The Milner Coal Company works 500 men, with a daily output of 1,000 tons, on a mine situated 8 miles northeast of Birmingham. The Southern Mining and Transportation Company, have a daily capacity of about 1,000 tons, and are situated about 6 miles from Birmingham. The Pierce Company, a Welsh firm, own 1,000 acres of excellent mining ground, about 30 miles north of Birmingham. The daily capacity is 500 tons per diem. The Alabama Mining and Manufacturing Company own the lands adjoining those of the Pierce Co.



## COAL IN ILLINOIS.

It is stated upon the authority of the Bureau of Labor, that nine million tons of coal were produced in this state during 1882; this came from forty-six counties. We must say that this is a gratifying exhibit, and it puts Illinois well up in the scale of coal producers in the United States. The statistics of Illinois coal interests, taken from the census reports of 1870 and 1880, from bases of comparison, and certainly indicate a very rapid growth of the industry under consideration. In 1870 there were 322 coal-producing establishments in the state. The total grew to 590 in 1880, and, according to the late report, to 704 in 1882. The number of men employed in 1870 was 6,301; in 1880 it was 14,078; and in the current year it is 19,420. The number of tons of coal produced has increased from 2,624,163 in 1870 to 6,115,377 ten years later, and to 9,115,653 during the year ended June 30th, 1882. The increase during the past two years is thus shown to nearly equal the entire increased output in 1880 over 1870, and to be fully 50 per cent. of the total production in 1880. The total amount of capital employed in the last year was \$8,230,183, and the average value of coal at the mines, per ton, is given at \$1.46.

The Streator coal field is an important district, having a large number of important coal companies operating within its borders, the output in 1882 was 721,559 tons, and the capacity nearly a million tons per annum, and the coal being sent to many western points. (La Salle county did a total of 1,119,030 tons in 1881). The quality for which the product of the top vein is most prized is its excellence as a steam coal. For this purpose it is declared to have no equal in this or adjoining states. For domestic purposes, it is usually considered inferior to the product of the third vein, owing to the fierceness and rapidity of its combustion. Some of the mines, however, in this vein, have discovered in their seam those qualities which are peculiarly fitted for household consumption and are developing a good trade in that direction. For about all the purposes of coal, the Streator vein can be used with good satisfaction, but as a producer of steam it is peerless and unrivaled.

St. Louis, Mo., obtains by far the largest proportion of its fuel supply from Belleville, St. Clair county, Illinois. Chicago receives a large portion of its coal from the Wilmington District, where are several important coal mining companies, and we have the official statement that the output in 1882, was 1,158,280 tons, as against 961,060 tons in the preceding year.

The Streator coal has been coked with good results, and the operators are likely to go into this industry.

## COAL IN COLORADO.

The output of coal continues to increase as the country is settled, and business enterprises are started on a solid footing. We put the output at 1,000,000 tons for last year, and this may be within the mark. While the real interests in the northern part of the State have prospered, it is in the southern portion that the greatest strides have been made, for which the Colorado Iron and Coal Company must receive the credit. This corporation owns 15,000 acres of coal land, and 13,000 acres containing large deposits of iron ore. To develop these properties, the company has in operation coke ovens at El Moro and Crested Butte, a blast furnace at South Pueblo, with steel works

and a rolling mill at Denver. The following table shows the total output of the Canon City, Walsenburg and El Moro coal mines :—

Mines,	1879.	1880.	1881.	1882.
Canon City.....	78,000	107,575	125,902	141,504
Walsenburg.....	10,000	32,106	71,272	94,377
El Moro.....	21,000	81,697	150,585	235,449
Crested Butte.....	.....	.....	3,185	38,909
Totals.....	109,000	221,378	350,944	511,239

The company has 250 ovens at El Moro, and made 83,642 tons coke during the year. At Crested Butte, there were completed in the close of the year, one hundred ovens, and 9,128 tons coke were made there.

Reference was made in our last to the discovery of Anthracite in the Gunnison country, four miles north of Crested Butte. There are two seams,  $3\frac{1}{2}$  and  $5\frac{1}{2}$  feet in thickness; coal is a red ash, resembling the Lykens Valley of Pennsylvania. A breaker has been put up similar to those in Pennsylvania, and 250 tons a day has been mined and prepared. The coal is a true Anthracite, hard, bright, and forming an excellent fuel, as the subjoined analysis testifies: Fixed carbon, 93.93%; moisture, 3.15%; ash, 2.92%.

No exact figures concerning the output of the mines in Northern Colorado have been obtainable. It is safe to say, however, that the product of the Welch banks, at Louisville, and the Boulder Valley, at Erie, have been increased fifty per cent. over 1881. The Star and Marshall banks, as well as the South Park mines, at Como, likewise show something of an increase.

The output in the southern part of the State during a series of years has been as below :—

Year.	Tons.	Year.	Tons.
1873.....	12,187	1878.....	82,140
1874.....	18,092	1879.....	120,102
1875.....	15,278	1880.....	221,378
1876.....	20,316	1881.....	350,944
1877.....	44,410	1882.....	511,239

#### ANALYSES OF COLORADO BITUMINOUS COALS.

	Slate River.	Canon I.	Canon II.	Walsenburg.	Crested Butte.
Water.....	1.50	4.50	6.15	3.23	0.44
Vol. matter.....	22.80	34.20	36.03	40.93	24.17
Fixed carbon.....	68.70	56.80	52.82	49.54	72.30
Ash.....	7.00	4.50	5.00	6.30	3.09

#### COMPARING WITH PENNSYLVANIA COAL AND COKE.

Coal.	Water.	Vol. Matter.	Fixed Carbon.	Ash.	Sulphur.
El Moro.....	0.26	29.66	65.76	4.32	0.85
Connellsville.....	1.26	30.11	59.62	8.23	0.78
			Fixed Carbon.	Ash.	Sulphur.
El Moro.....			87.47	10.68	0.85
Connellsville.....			87.26	11.79	0.75
Crested Butte.....			92.03	6.62	.....

## COAL IN THE INDIAN TERRITORY.

At McAlester, I. T., the Osage Coal Mining Company are working a considerable tract of coal land, and the character of the coal and the coke made therefrom may be judged of, from the following comparative analyses :—

CONSTITUENTS.	MCALESTER.		PITTSBURGH.	
	Coal.	Coke.	Coal.	Coke.
Moisture.....	2.10	0.325	3.15	0.490
Volatile matter.....	29.71	2.560	28.35	....
Fixed carbon.....	62.67	87.140	61.12	87.456
Ash.....	5.52	9.975	5.38	11.332
Phos. acid.....	....	....	....	0.029
Sulphur.....	....	....	2.10	0.693

## COAL IN TEXAS.

As Texas has never yet had a geological survey, the extent of her coal strata is not well defined. It is supposed, however, to embrace about thirty thousand square miles, in the northern and western portions of the State. Over this great area coal has been found at a great many places, but at no place has it been mined except to a very small extent. It is a Bituminous coal, and almost, if not quite, precisely similar to the McAlester coal of the Indian Territory. Some Anthracite has also been discovered in this coal territory. The railroads are now penetrating the coal formations of Texas, and this great source of wealth will soon, doubtless, be rapidly developed. Extensive openings were made last year at and near Laredo. In addition to the true coals of Texas, there is an immense bed of lignite which extends apparently across the entire State from northeast to southwest, in the eocene formation. It is said to be at some points twenty feet thick. This lignite much resembles cannel coal, and doubtless would be made quite equal to it by a process of pressure by machinery. It is very fat in various oils and gases.

Bridgeport, Conn. ; say 250,000 tons in 1882.

New Haven, Conn. ; say 775,000 tons in 1882.

IMPORTS AND EXPORTS OF COAL.

The tariff from 1824 to 1843 was six cents per bushel, or \$1.68 per ton; from 1843 to 1846, \$1.75 per ton; 1846, 30% ad valorem; 1847 to 1861, 24% ad valorem; 1862-3-4, \$1.00 per ton; 1865, \$1.10; 1866 to 1872, \$1.25 per ton; since August, 1872, 75 cents per ton. During the period from June, 1854, to March, 1866, the Reciprocity treaty was in force, and coal from the British possessions in North America was admitted into the United States, duty free. The imports are from Australia and British Columbia to San Francisco; from Great Britain to the Atlantic and Pacific coasts; from Nova Scotia to Atlantic coast ports. Exports are mainly from the Lake and Atlantic shipping ports to the Canadian Provinces, and to the West Indies. The exports are growing, and we may expect this condition of things to continue, as the Canadian Provinces are taking more largely of our Anthracite coal every year. We do not ship as much Bituminous coal to the West Indies and to Central and South America, as our geographical position would seem to entitle us. The totals for the calendar years named were as below:

	Tons, 1882.	Tons, 1881.
IMPORTS—Bituminous .....	774,425	824,875
EXPORTS—Anthracite.....	531,836	538,090
Bituminous.....	413,171	232,073

We have the report that 475,000 tons coal were received at San Francisco from foreign ports in the last calendar year; it will be seen that there is very little remaining over for the other customs districts. Taking the figures of the last fiscal year, we find that there were 851,334 tons imported, and as the grain trade was very profitable from San Francisco, over 660,000 tons were received at that point and San Diego. There was coal from British Columbia, Australia and Great Britain, but the figures will not be so large during the next fiscal year, as grain freights are 'off.' A glance at the report of San Francisco will show the changes that have taken place. We recapitulate the imports and exports for the last fiscal year:

IMPORTS.	From Great Britain.....	390,863 tons.
	From Canadian Provinces.....	117,831 tons.
	From British Columbia.....	172,625 tons.
	From Australia.....	166,425 tons.
	All other ports (mainly ship stores, sold here)...	3,950 tons
RECEIVED at,	San Diego and San Francisco.....	660,136 tons.
	Other Pacific coast ports.....	17,480 tons.
	Boston, Mass.....	40,058 tons.
	Portland, Maine,...	40,667 tons.
	All other New England ports.....	32,147 tons.
	New York.....	37,776 tons.
	All other ports on the Atlantic.....	23,074 tons.



Of the coal imported north and east of New York on the Atlantic seaboard, 60,769 tons was 'Culm' of coal.

EXPORTS.		Tons, Bituminous.	Tons, Anthracite.
	To Quebec, Ontario, Etc.....	199,671	501,497
	To Cuba.....	75,385	24,934
	To Mexico.....	7,028	9,545
	Other ports and places (41 in number)....	32,236	17,766
		314,320	553,742
SHIPPED FROM	Baltimore, Md.....	45,430	.....
	Champlain, N. Y.....	.....	95,783
	Cleveland, Ohio.....	87,525	31
	Detroit, Mich.....	53,015	94
	Genesee, N. Y.....	226	56,755
	New York, (includes Perth Amboy, etc.,). 3,481	73,554	
	Oswego, N. Y.....	294,675	
	Philadelphia.....	61,885	21,515
	Other ports and places (29 in number) ....	62,758	11,335
		314,320	553,742

### THE COAL FIELDS OF NOVA SCOTIA.

The first to be noticed is the Sydney Coal Field, on the east shore of Cape Breton. Its area of available coal is estimated at 300 square miles. It contains ten coal seams, from 3 to 12 feet in thickness, besides numerous smaller beds. The coals are highly Bituminous and coking. Many of the seams yield coal well adapted for gas making, the returns of practical working show from 8,000 to 10,000 feet of gas of 15 to 16½ candle power to the ton. It is also, as appears from numerous certificates, almost equal to Welsh steam coal. Several of the seams enjoy an enviable reputation as good domestic coals, for grate and range purposes.

Coal is also found at Loch Lomond, River Inhabitants, Port Hood, Mabou and other points in Cape Breton, but little attention has been paid to these localities.

The Pictou Coal Field covers an area of about 35 square miles, and is noted for the unusual development of some of the beds. There are 16 seams known, from 3 to 35 feet in thickness. The coal is not as Bituminous as that from the Sydney district, but is still a coking coal, except in the case of a few seams. It is largely used at Londonderry as coke, and in the raw state for smelting iron ore. The coal has its chief reputation as a good strong steam coal, adapted for use under all forms of boilers, and is largely used on the Intercolonial, Grand Trunk and other Canadian railways.

The Cumberland Coal Field is not yet explored over its whole extent but its area has been estimated at 300 square miles.

Operations have hitherto been confined chiefly to the Spring Hill and Joggin mines, but several new mines are being opened out.

The coal is similar to that of the Pictou district, and is largely used for steam and domestic purposes.

Coal is met at River John (Pictou) and several points in Cumberland and Colchester counties, but little is known about it.

The foregoing remarks will show that there is a large supply of coal available in the Province, and that the different localities furnish the qualities required for almost every domestic and industrial use. The quantity of coal raised was much larger last year, but the deliveries to the United States do not grow, as the shipments tabulated below will prove.

The Inspector of Mines, EDWIN GILPIN, furnishes the following summary of the coal sales of Nova Scotia, since the beginning of the industry in the province.

Year.	Tons.	Year.	Tons.
1785—1790.....	14,343	1872.....	785,914
1791—1800.....	51,048	1873.....	881,106
1801—1810.....	70,452	1874.....	749,127
1811—1820.....	91,527	1875.....	706,795
1821—1830.....	140,820	1876.....	634,207
1831—1840.....	839,981	1877.....	687,065
1841—1850.....	1,533,798	1878.....	693,511
1851—1860.....	2,998,829	1879.....	688,624
1861—1870.....	4,927,339	1880.....	954,659
Total to 1871.....	10,069,143	1881.....	1,035,014
1871.....	596,418	1882.....	1,250,179

The duty on the coal imported into the United States from Nova Scotia is seventy-five cents per ton, gold, on the round or coarse coal, and thirty cts per ton, on the culm or slack; that is the coal which passes through bars not wider than three-quarters of an inch. About ten per cent. of the coal is culm. We give below the duty at various dates :—

1846 to 1862.....	24 per cent. ad valorem.
1862—3—4.....	\$1.00 per ton.
1865.....	\$1.10 per ton.
1866—1872.....	\$1.25 per ton.
1872 to date.....	.75 per ton.

Reciprocity Treaty in force from June, 1854, to March, 1866.

Number of tons actually raised during a term of years :—

Year.	Tons.	Year.	Tons.
1865.....	715,786	1874.....	872,720
1866.....	664,998	1875.....	781,165
1867.....	517,525	1876.....	709,646
1868.....	462,188	1877.....	757,496
1869.....	578,062	1878.....	770,603
1870.....	625,769	1879.....	788,271
1871.....	673,242	1880.....	1,032,710
1872.....	880,950	1881.....	1,124,270
1873.....	1,051,467	1882.....	1,365,811

The destination of the coal sold during the year 1882, together with a comparison of the "markets" is shown below :—

Markets.	1882—Tons.	1881—Tons.	1880—Tons.	1879—Tons.	1878—Tons.
Nova Scotia.....	458,952	382,343	352,913	278,120	279,172
Quebec.....	383,031	268,628	739,091	154,118	83,710
New Brunswick.....	153,617	123,526	97,817	84,731	115,245
Newfoundland.....	79,732	62,174	60,626	57,651	61,361
P. E. Island.....	50,096	49,313	46,767	44,891	43,412
United States.....	99,302	113,728	123,423	51,641	88,495
West Indies.....	22,386	21,620	12,165	10,124	16,999
South America.....	1,462	561	.....	.....	523
Europe.....	1,601	13,051	12,857	7,348	3,594
Total.....	1,250,179	1,035,014	954,659	688,624	693,511

## GREAT BRITAIN.

The quantity of coal produced in Great Britain, is stated by the keeper of the mineral statistics to be 154,184,300 tons for the year 1881. The returns for the year 1882 will not come in until about August of this year. Production has grown fully sixty per cent. in twenty years. The total in 1860 was 83,200,000 tons, with an export trade of 7,400,000 tons. The total exports of coal during 1882 (including coal for steamers engaged in the foreign trade, 5,575,160 tons) were 26,533,980 tons, or nearly equal to the amount of Anthracite coal marketed in the United States, during the same period of time. We append a few details of the coal production :—

Year.	Tons.	Year.	Tons.
1870.....	112,875,725	1876.....	133,344,766
1871.....	117,352,028	1877.....	134,610,763
1872.....	123,386,750	1878.....	132,607,866
1873.....	127,012,767	1879.....	134,008,288
1874.....	125,043,257	1880.....	146,969,409
1875.....	131,867,105	1881.....	154,184,300

The distribution of the coal mined, is estimated as having been partly as below :—

	Tons.		Tons.
In Iron and Steel making.....	33,500,000	Gas Works.....	7,000,000
Domestic consumption.....	35,000,000	Locomotive use.....	3,000,000
Exported.....	20,000,000	Textile industries.....	15,000,000
Glass W'ks, Potteries, etc.....	12,500,000	Steamships.....	10,000,000
Used at collieries.....	7,000,000	Engineering works.....	5,000,000

There were 3,847 collieries, employing 495,477 persons in the year 1881. Prices at the pits averaged about eight shillings a ton.

The receipts of coal at London, for a series of years, have been as below :—

Year.	By Sea.	By Canal.	By Rail.	Total.
1872.....	2,762,712	6,615	4,449,141	7,218,468
1873.....	3,548,918	8,236	4,999,268	7,556,422
1874.....	2,665,630	11,195	5,147,413	7,824,288
1875.....	2,727,719	5,982	4,689,785	7,423,486
1876.....	3,134,846	4,594	5,065,452	8,204,892
1877.....	3,273,443	4,696	5,173,237	8,451,375
1878.....	3,170,601	4,608	5,426,204	8,501,413
1879.....	3,198,309	2,977	5,593,290	8,794,576
1880.....	3,508,526	2,910	6,547,395	10,058,811
1881.....	3,714,708	508	6,200,272	9,915,488
1882.....	3,826,520	7,984	6,546,271	10,372,791

Of the receipts in 1882, some 2,704,814 tons were afterward conveyed beyond the limits, leaving 7,667,977 tons as consumed in the city.

The exportations of coal from Great Britain have been as below :—

Year.	Tons.	Year.	Tons.
1871.....	12,851,957	1877.....	15,420,050
1872.....	13,211,961	1878.....	15,483,816
1873.....	12,712,222	1879.....	16,435,642
1874.....	13,927,205	1880.....	18,702,551
1875.....	14,475,036	1881.....	19,591,598
1876.....	16,299,077	1882.....	20,958,824

The coal produced in 1881, was from the following districts : Northumberland, 15,830,720 ; South Durham, 21,532,773 ; Lancashire, 9,326,722 ; Yorkshire, 18,287,141 ; Derby, etc., 15,545,667 ; Staffordshire, 16,532,570 ; South Wales, 16,008,525 ; Scotland, 20,823,055 ; and North Wales, 11,843,685 tons.

## COAL IN THE GERMAN EMPIRE.

This country, as now consolidated, is one of the largest producers of coal in Europe. Since 1870, the Empire includes old Prussia, Saxony, Bavaria, and the States of the Zollverien. The grand total of the output in 1871, when the consolidation of the empire was completed, was 37,852,464 tons of 2,240 lbs.

## OUTPUT OF COAL IN THE EMPIRE, AS NOW CONSTITUTED.

Year.	Tons.	Year.	Tons.
1848.....	4,383,585	1874.....	35,918,614
1857.....	11,279,266	1875.....	37,436,368
1867.....	23,808,071	1876.....	38,454,428
1868.....	25,704,758	1877.....	33,672,025
1869.....	26,774,368	1878.....	35,500,167
1870.....	26,397,770	1879.....	37,674,648
1871.....	29,373,272	1880.....	42,172,944
1872.....	33,306,418	1881.....	48,688,151
1873.....	36,392,280		

## OUTPUT OF LIGNITE IN THE EMPIRE AS NOW CONSTITUTED.

Year.	Tons.	Year.	Tons.
1848.....	1,417,420	1874.....	10,739,532
1857.....	3,587,855	1875.....	10,367,686
1867.....	6,994,818	1876.....	11,096,034
1868.....	7,174,365	1877.....	8,636,597
1869.....	7,569,545	1878.....	8,341,366
1870.....	7,605,234	1879.....	9,278,354
1871.....	8,482,838	1880.....	9,874,888
1872.....	9,018,048	1881.....	12,852,324
1873.....	9,752,914		

## COAL IN AUSTRIA.

In this country coal mining dates back to the year 1550. In 1819, it had amounted to 94,607 tons ; in 1825, to 154,944 tons ; in 1830, to 211, 298 tons ; in 1835, to 250,782 tons ; in 1840, to 479,212 tons ; in 1845, to 721,707 tons ; in 1850, 944,323 tons ; in 1855, 2,101,050 tons ; in 1860, 3,496,495 tons ; in 1865, 5,069,303 tons. The coal is divided into Lignite, (say 6,000,000 tons annually) and Stone coal. Output has been as below :

Year.	Tons.	Year.	Tons.
1870.....	8,355,944	1876.....	13,362,586
1871.....	10,048,038	1877.....	14,252,038
1872.....	10,556,067	1878.....	14,500,000
1873.....	11,904,073	1879.....	15,447,292
1874.....	12,279,757	1880.....	16,500,000
1875.....	12,852,046	1881.....	19,000,000

The above includes the mineral produced in Hungary. Something like 1,500,000 tons coal are received from Prussia, and there are nearly 2,750,000 tons sent to Germany annually.



## COAL IN RUSSIA.

French capital is engaging very largely in developing the mineral resources of this country. Official reports of the coal output as prepared by the department of mines, are as below :—

Year.	Tons.	Year.	Tons.
1867.....	437,625	1876.....	1,788,779
1871.....	829,745	1877.....	1,769,783
1872.....	1,097,864	1878.....	2,475,390
1873.....	1,170,979	1879.....	2,864,534
1874.....	1,266,637	1880.....	3,218,661
1875.....	1,677,019	1881.....	3,255,000

Metric tons, 2,204 lbs.

There is said to have been 400,000 tons of what is termed Anthracite, produced in 1881. Coal production is increasing, and a still further development is looked for in the immediate future. A recent communication states the coal output to be equal to 4,500,000 tons annually.

## COAL IN NEW SOUTH WALES.

Year.	Tons.	Year.	Tons.
1829.....	780	1874.....	1,261,351
1839.....	21,283	1875.....	1,253,475
1849.....	48,516	1876.....	1,319,918
1859.....	308,213	1877.....	1,444,171
1869.....	919,774	1878.....	1,575,926
1870.....	868,564	1879.....	1,583,381
1871.....	898,784	1880.....	1,571,736
1872.....	1,012,426	1881.....	1,775,224
1873.....	1,002,862		

## COAL IN BELGIUM.

The process of the extraction of coal has been as below, in metric tons of 2,204 lbs.

Year.	Tons.	Year.	Tons.
1830.....	2,345,797	1870.....	13,697,118
1835.....	2,557,097	1871.....	13,733,176
1840.....	3,929,962	1872.....	15,658,948
1845.....	4,919,156	1873.....	15,778,401
1850.....	5,820,884	1874.....	14,667,029
1855.....	8,409,330	1875.....	15,011,331
1860.....	9,609,895	1876.....	14,339,578
1865.....	11,840,703	1877.....	13,938,523
1866.....	12,774,662	1878.....	14,899,175
1867.....	12,755,822	1879.....	15,446,512
1868.....	12,298,589	1880.....	16,887,047
1869.....	12,943,994	1881.....	16,873,551

## COAL IN FRANCE.

Statistics of the output are given below, in metric tons of 2,204 lbs.

Year.	Tons.	Year.	Tons.
1787.....	215,000	1872.....	16,100,773
1802.....	844,180	1873.....	17,485,786
1811.....	773,694	1874.....	17,059,547
1820.....	1,093,658	1875.....	16,949,032
1830.....	1,862,665	1876.....	17,104,794
1840.....	3,003,382	1877.....	16,877,200
1850.....	4,433,567	1878.....	16,960,416
1860.....	8,309,622	1879.....	17,110,979
1865.....	11,652,755	1880.....	19,412,112
1870.....	13,179,708	1881.....	19,909,057
1871.....	13,240,135		

The consumption of coal in France, is about 29,000,000 tons, for in the year 1880 there were 3,291,155 tons received from Great Britain; 4,157,010 tons from Belgium and 982,332 tons from Germany. The price of native coal at the pits was said by the Minister of Public works, to be 10s. 2½d. per ton, and the average cost of transportation to points of consumption, 7s. 5d. per ton. Number of hands employed was 107,236 and the average wages were £41. 12s. per annum. The departments of the Nord and Pas-de-Calais are the most important producers, and furnish about 40 per cent of the total output. The shipments of coal at British ports during 1882 destined for France amounted to 3,603,514 tons. Dust is imported from Wales and made into artificial fuel; its cost is \$4.42 to \$4.87 per ton.

## THE COAL PRODUCTION OF THE WORLD.

We have tabulated the following schedule, from the best sources, and the figures may be taken as essentially correct:

Countries.	Square miles of Coal Area.	Tons 1870.	Tons 1879.	Tons 1880.	Tons 1881.
Great Britain.....	11,900	110,431,192	134,008,288	146,818,622	154,184,300
United States.....	192,000	32,863,690	59,808,398	69,200,934	76,221,934
Germany.....	1,770	34,003,004	46,953,002	52,047,832	61,540,475
France.....	2,086	13,179,708	17,110,979	19,412,112	19,909,057
Belgium.....	510	13,697,118	15,446,512	16,887,047	16,873,551
Austria.....	1,800	8,355,944	15,447,292	16,500,000	19,000,000
Russia.....	30,000	829,745	2,864,534	3,218,661	3,255,000
Spain.....	3,501	661,927	775,000	800,000	800,000
Nova Scotia.....	18,000	625,769	788,271	1,032,710	1,124,270
Australia.....	24,840	868,564	1,583,381	1,571,736	1,775,224
India.....	2,004	500,000	4,000,000	4,000,000	4,000,000
Japan.....	5,000	.....	750,000	850,000	800,000
Vancouver's Island.	390	29,863	228,974	282,128	325,000
Chili, 50,000; Sweden, 90,000; Italy, 220,000; China, 4,000,000.....					
					4,360,000

## COAL IN MEXICO.

Mr. William H. Adams, mining engineer, writes of the coal in the Santa Rosa district of Northern Mexico; that in this region nature has disclosed near the surface seemingly inexhaustible beds of semi-Anthracite and Bituminous coals. Several openings which have been made about 100 miles northwest of the Rio Grande, confirm the excellence of the coal found in this locality, which at one time must have experienced great volcanic disturbances, the seat of the volcanic action being marked and easily traceable. Anthracite veins have been opened to a depth of some 240 feet, and surface openings at several points give evidence of large deposits of the valued treasures. Some of the coal found in this region is estimated to yield about 60 per cent. in weight of good coke. Bituminous coal is found from 30 to 50 miles east of the Rio Grande, and lignites are distributed through a large portion of the country drained by that river.

## COAL IN CHINA.

A paper was read in July last before the Paris Academy of Science, by M. Fuchs on the coal basins of Ton-Kin. He has studied them for three months, December, 1881, and January and February, 1882, with M. Saladin, geologist, and had explored the principal deposits of coal, iron ore and gold, which are now accessible. The measures, which in Indo-China enclose the coal, form a series of basins of considerable importance, which appear to be arranged parallel with the sea. They overlie the carboniferous limestone, and are in turn covered by thick strata of sandstone, conglomerate and argillaceous rocks, presenting great analogy with the Permian Formation and lower Triassic Formation of Europe. The measures themselves almost entirely consist of felspathic and light micaceous, or more or less ferruginous, sandstone. The coal crops out of the surface to the northern coast of the ancient gulf, carbonated by the waters of the Yellow River, and has been proved for an extent of 110 kilometres (68 miles) and a breadth of 15 kilometres (9 miles.) This breadth is certainly less than that of the coal basin, and only applies to the region which could be explored. In those parts of the deposits which have been explored, that is to say, to the depth of 100 metres below the level of the sea, the thickness of the seams is about 5 metres on an average, and does not exceed 11 metres. M. Fuchs has brought back with him several impressions of plants, which permit of comparing of flora of these basins with others in China, and also in India. The coal deposits are so much the richer in volatile substances as they are found in more elevated regions; and the coal, if not of quite so high a calorific power as that of Anzin is not very inferior.

**NATAL.**—A geological survey of Natal shows that this British African province possesses a considerable quantity of valuable iron ore and an immense coal field, which may be utilized with comparative ease.

**PATAGONIA.**—A seam of coal has been worked for some years at the Straits of Magellan. It is seven feet in thickness, and five thousand tons a month have been disposed of to the steamers passing through the Straits.

**SWEDEN.**—A larger and more rapid development of the deposits is expected to take place from the improved facilities of delivery. The output in 1880, was 100,370 tons. There was shipped from British ports to Sweden during 1882, 1,528,121 tons of coal.

In **JAVA**, the coal-fields of the Ombillion territory are attracting special attention, and possibly a scheme for satisfactorily working these deposits may ere long be mooted. At present, the only mine in active work is the so-called 'Oranje Nassau' mine, situated at Pengron, a district of southeast Borneo. The production of this mine during the year 1881 amounted to 5,345 tons of block coal, and 2,731 tons of small coal. The quality of this coal is similar to that of fair Australian.

**INDIA.**—The principal source of supply is the Bengal coal field, which is 100 miles in extent. The Central Provinces also contain large coal deposits, which are now being developed. In 1880, the output of Indian coal was 1,016,040 tons. There is an important business in British and Australian coals, with the coastwise ports, although the coal is said to be from 17 to 20 rupees per ton. In 1882 there were 993,477 tons of coal loaded at British ports destined for India.

**SOUTH AFRICA.**—Coal deposits have, for a number of years, been known to exist in the vast range of mountains that skirt the northern part of King William's Town, South Africa, and in the neighborhood the coal has been extensively used by farmers for domestic purposes. The Colonial Government has latterly taken means to encourage the development of these deposits, and is extending the North Border railway to the coal fields. The road will afford every facility for cheap transportation of material as well as for the further development of the country, and future progress will depend, in a great measure, on its extension and proper maintenance.

**ASIA MINOR.**—Coal has been found in the district of Suléimanié, near a tributary of the Tigris. The coal which has been extracted is said to be of excellent quality. The extent of the coal field is not yet known, and the richness of the mine can consequently not be determined, but it is calculated from what is already known that there is sufficient coal to supply all the steamboats on the rivers Euphrates and Tigris during ten years. The coal basin probably extends in the direction of the Tigris, and suitable preparations have been made to develop the mine and build a road to the river.

**HONDURAS.**—Coal is very abundant on the Atlantic coast, near the river Uloa, the quality being a semi-bituminous kind. As the quantity seems to be quite considerable, this mineral will, in the near future, become a valuable article of commerce along the Caribbean coast. Mining property is not taxed, and there is no duty on the exportation of ores or bullion; and the Government is so anxious to encourage the industry that it will render all assistance in its power for the transportation of machinery, and will free it of importation duties.

**NEW ZEALAND.**—Mines are being worked in this part of the world which have unique features, namely, the thickness of the coal seams, which range from 6 feet to 53 feet 6 inches in thickness, and the fact that these enormous deposits are placed, and can be easily worked, at an altitude of from 800 feet to 3,000 feet above sea level. Some of these seams are exposed on the faces of the cliffs, and can be got at with the greatest ease by tunnelling.



## APPENDIX.

## ANTHRACITE COAL REGIONS OF PENNSYLVANIA.

In order to systematically attend to the matter of proper ventilation, etc., the mines are divided into six inspection districts, as named below :

FIRST.—Pottsville district, embracing collieries the production of which is known in market as Schuylkill and Lorberry coal. Mr. Samuel Gay, Mine Inspector.

SECOND.—Shenandoah district, embracing collieries in the Shenandoah and East Mahanoy regions, of the Schuylkill coal field. Mr. Robert Mauchline, Mine Inspector.

THIRD.—Shamokin district, embracing those collieries located in the western part of Schuylkill, eastern Northumberland and Dauphin counties. Coal sold as Lykens Valley, Shamokin and Mahanoy. Mr. James Ryan, Mine Inspector.

FOURTH.—Wilkes-Barre district, includes the collieries in the northern coal field in the middle district of Luzerne county. Mr. G. M. Williams, Mine Inspector.

FIFTH.—Scranton district, includes those collieries in the Lackawanna, Scranton and Pittston regions, located in eastern Luzerne, and in Lackawanna county. Mr. P. Blewitt, Mine Inspector.

SIXTH.—Lehigh district, includes collieries in Carbon, and in the southern part of Luzerne counties. Mr. J. E. Roderick, Mine Inspector.

## SHIPMENTS OF COAL FROM LEHIGH DISTRICT IN 1882.

	Tons.
Several mines of.....A. Pardee & Co.....	608,371.01
Lattimer, Nos. 1 and 2.....Pardee Bros. & Co.....	220,600.18
Hollywood, Nos. 1 and 2.....C. Pardee & Co.....	116,242.18
Mt. Pleasant, Nos. 1 and 2.....Pardee, Sons & Co. ....	132,605.15
Oak Dale, Nos. 1 and 2.....G. B. Markle & Co.....	230,223.14
Highland, Nos. 1 and 2.....".....	158,132.01
Milnesville, Nos. 1 and 2.....The Stout Coal Co.....	110,468.01
Drifton, 1, 2 and 3, and Gowen ..Coxe Bros. & Co.....	510,926.07
Buck Mountain.....Buck Mountain Coal Co.....	110,558.03
East Sugar Loaf, 1, 2, 3 and 5.....Linderman, Skeer & Co.....	308,258.00
Humboldt.....".....	81,232.19
Council Ridge, 2 and 5.....J. Leisenring & Co.....	324,663.01
Black Ridge.....Black Ridge Coal Co.....	60,533.02
Upper Lehigh, 1, 2, 4 and 6.....Upper Lehigh Coal Co ..	343,771.10
Sandy Run, 1 and 2.....M. S. Kemmerer & Co.....	168,759.06
Tresckow, 1 and 5.....E. B. Leisenring.....	126,125.07
Yorktown, 2 and 6.....G. H. Myers & Co.....	169,513.03
Spring Mountain, 1, 2, 3 and 6....J. C. Haydon & Co.....	218,276.16
Coleraine, 1 and 2.....W. T. Carter & Co.....	139,864.18
Beaver Brook.....C. M. Dodson & Co.....	87,522.10
Lansford, 3, 4, 5 and 6.....Lehigh Coal and Nav. Co.....	393,880.17
Ebervale, 1, 2, 3 and 5.....Ebervale Coal Co.....	238,319.04
Harleigh, 2 and 4.....McNair & Co.....	80,831.16

Totals.....4,939,780.19

## COAL PRODUCED IN SCRANTON DISTRICT—1882.

		Tons.
Mines of.....	D. L. & W. R. R. Co.....	2,098,198
Mines of.....	Del. & Hudson Canal Co. ....	1,505,663
Mines of.....	Pennsylvania Coal Co.....	1,433,281
Mines of.....	Hillside Coal and Iron Co.....	269,752
Everhart.....	Waddell & Co.....	44,954
Tompkins.....	G. R. Wilson & Co.....	41,500
Fairmount.....	A. Morris & Co.....	57,986
Seneca and Twin.....	Pittston Coal Co.....	71,473
Beaver.....	Waterman & Beaver.....	19,587
Butler & Mosier.....	Butler Coal Co.....	123,985
Belmont.....	Butler Coal Co.....	56,671
Heidelberg Shaft.....	Lehigh Valley Coal Co.....	55,500
Phoenix.....	Sanderson & Co.....	31,417
Columbia.....	Grove Brothers.....	25,825
Greenwood & Sibley.....	Penn. Anth. Coal Co.....	216,443
National and Meadow Brook.....	W. Connell & Co.....	245,661
Mt. Pleasant.....	Mt. Pleasant Coal Co.....	126,926
Capouse and Pine.....	Lack. Iron and Coal Co.....	340,563
Fairlawn.....	Fairlawn Coal Co.....	38,633
G. R. Slope.....	Green Ridge Coal Co.....	151,511
Elk Hill.....	Elk Hill Coal Co.....	55,963
Filer.....	Filer & Livey.....	67,418
Pierce.....	Pierce Coal Co.....	129,706
Eaton.....	Jones, Simpson & Co.....	102,911
Pancoast & Throop.....	Pancoast Coal Co.....	72,097
Eagle Shaft.....	Northern Coal Co.....	34,219
Bridge Shaft.....	The Bridge Coal Co.—limited...	68,585
Total.....		7,439,485

## SHIPMENTS FROM POTTSVILLE DISTRICT, 1882.

		Tons.
Philadelphia & Reading Coal and Iron Co.....		581,642
Ellsworth.....	John R. Davis.....	15,036
Eagle.....	G. W. Johns & Bro.....	28,594
Kalmia.....	Phillips & Sinefer.....	201,100
Lincoln.....	Levi Miller & Co.....	165,678
Rausch Creek.....	Miller, Greaff & Co.....	62,682
Lehigh, 8, 10, 11.....	Lehigh Coal & Navigation Co.....	300,638
Palmer Vein.....	Alliance C. M. Co.....	35,596
Northdale.....	" "	2,968
St. Clair.....	Jos. Atkinson.....	4,858
Black Mine.....		5,628
West Lehigh.....	Wood & Pierce.....	12,000
Middle Lehigh.....	Mill Creek Coal Co.....	146,432
East Lehigh.....	Mitchell & Simons.....	8,461
Sharp Mountain.....	Thomas Wren.....	1,265
Greenwood.....	Raabe & Fey.....	2,480
Pine Dale.....	Louis Lorenz.....	1,827
Repplier.....	John F. Quinn.....	4,250
Small Operators.....		41,404
Consumed or sold at collieries.....		96,753
Total.....		1,709,280

## SHIPMENTS FROM THE SHENANDOAH DISTRICT-1882.

	Tons.
Philadelphia & Reading Coal & Iron Co.....	1,970,099
Cuyler.....S. M. Heaton & Bro.....	175,949
Wm. Penn.....Wm. Penn Coal Co.....	228,000
Oakdale.....E. L. Powell.....	10,000
Kohinoor.....R. Hecksher & Co.....	162,000
Kehley Run.....Thomas Coal Co.....	79,616
Cambridge.....Cambridge Coal Co.....	10,939
East Bear Ridge.....Myers, McCreary & Co.....	65,491
West Bear Ridge....." " " ".....	69,283
Stanton.....Miller, Hoch & Co.....	68,733
Laurel Ridge.....John A. Dutter.....	24,104
Lawrence.....Lawrence, Merkle & Co.....	95,368
North Star.....Reynolds & Roberts.....	8,465
Webster.....L. S. Baldwin.....	25,381
Coal Run.....Suffolk Coal Co.....	136,191
Glendon.....Glendon Coal Co.....	111,436
Coplay.....L. F. Lentz.....	75,958
Primrose.....Primrose Coal Co.....	56,460
West Lehigh.....F. Hazard.....	47,666
Staffordshire.....Jones & Oliver.....	7,881
Honey Brooks 1, 4, and 5.....E. B. Seisenring Cont.....	323,380
Packer 1, 2, 3 and 4.....Lehigh Valley Coal Co.....	536,857
Draper.....Oliver Diston.....	114,631
Consumed or sold at colliery.....	259,130

Total.....4,661,024

## OUTPUT OF SHAMOKIN DISTRICT.

	Tons.
Philadelphia & Reading Coal and Iron Co.....	1,518,206
Big Mountain.....Patterson & Llewellyn.....	168,769
Excelsior.....Excelsior Coal Co.....	125,464
Euterprise.....Baumgardner & Co.....	127,019
Locust Gap.....Greaber & Shepp.....	73,204
Henry Clay.....J. Langdon & Co.....	91,674
Peerless.....Cruikshank & Co.....	47,829
Sterling.....Kendrick & Co.....	99,389
Ben Franklin.....Baumgardner & Douty.....	31,007
Mónitor.....Geo. W. Johns & Bro.....	131,546
Collieries of.....Mineral R. R. & M. Co.....	438,738
Short Mountain.....Lykens Valley Coal Co.....	195,095
Williamstown.....Summit Branch Coal Co.....	342,218
Hazle Dell.....Luke and Jones.....	7,638
Mt. Carmel.....Montelius, Robinson & Co.....	170,643
Big Mine Run.....J. Taylor & Co.....	132,362
Continental.....Lehigh Valley Coal Co.....	16,542
Buck Ridge.....May, Audenried & Co.....	66,555
Franklin No. 2.....S. S. Bickel.....	23,368
Greenback.....H. J. Toudy.....	42,515
Montana No. 2.....A. H. Church.....	35,854
Logan and Centralia.....L. A. Riley & Co.....	319,452
Morris Ridge.....Isaac May & Co.....	55,490
Used at mines and small operators.....	328,583

Total.....4,588,799

## BITUMINOUS COAL IN PENNSYLVANIA.

There are twenty-seven counties in Pennsylvania in which Bituminous coal is produced, and our estimate of the coal mined during the year 1882 is twenty-two million tons, based on official figures that have come to hand and very careful estimates.

In order to systematically attend to the matter of proper ventilation, etc., the State is divided into four districts, and the inspectors of mines hold office for four years, the present incumbents holding commissions dating from May 15, 1881, and their several districts are as follows :—

FIRST DISTRICT.—James Louttit, for the counties of Greene, Washington, Fayette, Somerset, Bedford and that portion of Allegheny lying south of the Ohio and Monongahela rivers.

SECOND DISTRICT.—John J. Davis, for the counties of Beaver, Butler, Armstrong, Indiana, Westmoreland and that portion of Allegheny lying north of the Ohio and Monongahela rivers.

THIRD DISTRICT.—Thomas K. Adams, for the counties of Lawrence, Mercer, Crawford, Erie, Warren, Forest, Venango, Clarion, Jefferson, Clearfield, Cameron, Elk and McKean.

FOURTH DISTRICT.—Roger Hampson, for the counties of Cambria, Blair, Huntingdon, Centre, Clinton, Lycoming, Sullivan, Potter, Tioga, and Bradford.

The Bureau of Statistics forwards the facts and figures regarding this Industry, and we recapitulate as below :—

	I.	II.	III.	IV.
	Net Tons.	Net Tons.	Net Tons.	Net Tons.
Estimated output.....	10,237,458	7,307,580	4,618,245	3,500,000
Output of mines reporting.	6,554,080	4,175,760	3,679,245	
Persons employed.....	15,675	13,650	8,311	7,137
Casualties.....	57	34	17	12
Tons per life lost.....	330,240	214,928	271,661	291,666

That the production is only an estimate, is proved by the fact that in one district only 60 operators out of 130 replied to the circular of the mine inspector. In another 80 out of 115. In a third 80 out of 117. The estimate of the total is then based on the average of those reporting. It is evident that better laws are needed in this direction.

## GAS COAL MINES ON B. &amp; O. R. R. IN WEST VIRGINIA.

Operator.	Miles to Balt.
Austin Coal Co.....	263
Newburg N. O. C. Co.....	267
Montauk Mine.....	239½
Tyrconnel N. O. C. Co.....	292
Consolidated Coal Co.....	299
Murphy Run Coal Co.....	300
Despard Coal Co.....	300½
Harrison County Coal Co.....	301½
Monongahela Gas Coal Co.....	305½
Palatine N. O. C. Co.....	300½
Gaston, J. Boyce.....	300½
Central Mines.....	303
West Fairmount Coal Co.....	303½
Black, Sheridan & Wilson.....	309



## GAS COAL MINES ON B. &amp; O. R. R. IN PENNSYLVANIA.

Operator.	Miles to Balt.
B. F. Rafferty & Co., Eureka.....	288½
“ Smithton .....	289½
Port Royal Coal Co.....	291
C. P. Markle & Son.....	295
Osborn Coal Co .....	296
B. F. Rafferty & Co., Yough.....	296
N. J. Bigley .....	298
Youghiogheny River Coal Co.....	300
Rafferty & Co., Armstrong.....	302
“ Shaners.....	303½
Youghiogheny & Ash. C. & C. Co.....	305
Rafferty & Co., Alpsville.....	307
Osceola Coal Co.....	308
Saltsburg Coal Co.....	328

## COKE WORKS ON B. &amp; O. R. R. IN WEST VIRGINIA.

Operator.	Miles to Wheeling.	Miles to Balt.	Ovens.
West Fairmount Coal Co.....	75	304	30
Central Mines.....	76	303	10
Monongahela Gas Coal Co.....	73	305½	30
Newburg Orrell C. Co.....	111	267½	25
“ .....	112	266½	33
Austin Coal Co.....	115	263½	50

## SHIPMENTS OF COAL FROM WILKES-BARRE DISTRICT.

		Tons.
Mines of.....	Lehigh & Wilkes-Barre Coal Co.....	1,693,127
Mines of.....	Delaware & Hudson Canal Co.....	1,402,201
Mines of.....	Susquehanna Coal Co. ....	904,172
Mines of.....	Lehigh Valley Coal Co. ....	591,267
Mines of.....	Wyoming Valley Coal Co.....	397,650
Avondale.....	D. L. & W. R. R. Co.....	187,119
Boston.....	“ .....	94,341
Warrior Run.....	A. J. Davis.....	51,811
Kingston, 1 and 2.....	Kingston Coal Co.....	433,209
Gaylord.....	Gaylord Coal Co.....	168,804
Franklin.....	Franklin Coal Co.....	160,305
Enterprise.....	Andrew Langdon.....	145,456
Black Diamond.....	Haddock & Steel.....	82,946
East Boston.....	W. G. Payne & Co.....	115,000
Maltby.....	S. C. Maltby.....	30,551
Red Ash, Nos. 1 and 2.....	Red Ash Coal Co. ....	166,658
Raubville.....	Waddell & Walter.....	64,100
Dodson.....	Plymouth Coal Co.....	121,477
Salem.....	Salem Coal Co.....	47,450
Hillman.....	Hillman Coal Co.....	50,000
Chauncey.....	J. Roberts, Jr., & Co.....	23,593
Hollenback.....	R. S. Poole.....	13,182
West End.....	West End Coal Co.....	88,711
Bennet.....	Waddell & Co.....	26,226

Total.....7,066,356

## LIST OF MINES IN THE CLEARFIELD REGION.

Collieries.	Owners or Operators.	Address.
Morrisdale—1, 2, 3	R. B. Wigton & Sons. (338 Walnut st., Phila.)	Philipsburg.
Decatur	Decatur Coal Co.	"
Franklin	Kittaning Coal Co. (328 Walnut st., Phila.)	Houtzdale.
Derby	Barnes Bros.	Philipsburg.
Glenwood	Geo. Huff & Co.	"
Leonard	John Ashcroft.	"
Reading	Henry Liveright.	Osceola Mills.
Logan	H. J. Smith & Co. (201 Walnut Pl. Phila.)	"
Laurel Run	Josiah M. Bacon 329 Walnut st., Phila.)	"
Mapleton	Berwind, White & Co. (216 South 3d st., Phila.)	"
Goss Run	Berwind, White & Co.	"
Eureka—1, 2 and 3	Berwind, White & Co.	"
Phoenix	J. H. Orvis & Co., (Bellefonte, Pa.)	"
Moshannon—1 and 2	Moshannon Coal Co. (200 Walnut pl., Phila.)	Houtzdale.
Webster	J. C. Scott & Sons. (113 Walnut st., Phila.)	"
Ocean, Atlantic, Pacific	Harned, Jacob & Co. (408 Walnut st., Phila.)	"
Excelsior	Fisher, Bros. & Miller (Huntingdon, Pa.)	"
Sterling—1, 2 and 3	R. H. Powel & Co. (424 Walnut st., Phila.)	"
Powelton	W. J. Jackson	Osceola Mills.
Beaver	John Maurice & Co.	Houtzdale.
Philadelphia	P. Gallagher, Read & Co.	Osceola Mills.
Penn	Reakirt Bros. (218 Walnut st., Phila.)	"
Beaver Run	Beaver Run Coal Co. (228 Walnut st., Phila.)	"
Lancashire	C. Tucker & Co. (220 Walnut st., Phila.)	"
Coal Dale—1 and 2	R. H. Chipman & Co. (171 Broadway, N. Y.)	"
Colorado	A. & W. H. Barlow	Philipsburg.
Cody Ridge	H. K. Grant	"
Victor	Victor Coal Co.	"
Harrison	Beadling Bros.	Houtzdale.
Empire	Empire Coal Co.	Philipsburg.
Columbia	Mitchell & Keller	Osceola Mills.
Hawk Run	Jones, Mull & Co.	Philipsburg.
Spring Hill	A. B. Lueder	"
Pardee	Duncan, Lingle & Co.	"
Arctic	Holt, Passmore & Co.	"
Boynton	Boynton Coal Co.	"
Keystone	J. A. Losee	Osceola Mills.
Lancashire, No. 2	Barnes Brothers	Philipsburg.
Houtzdale	Houtzdale Coal Co.—limited.	Houtzdale.
Ashland	Ashland Coal Co.—limited (311 Walnut st., Phila.)	Phillipsburg.

## WAGES PAID FOR DIGGING COAL.

Alabama.....	45 to 50 cents per ton.
Along the Monongahela.....	3½ cents per bushel.
Angus, Iowa.....	\$1.12½ per ton.
Anthracite regions.....	85 cents per 2 ton car.
Belleville District, Illinois.....	1½ cents per bushel.
Brazil, Indiana.....	4 cents per bushel.
Bridgeport, Ohio.....	75 cents per ton.
Boulder, Colorado.....	90 cents per ton.
Clearfield region, Pennsylvania.....	50 cents per ton.
Connellsville Coke region.....	1 cent per bushel.
Coalton, Kentucky.....	70 cents per ton, screened coal.
Coal Creek, Indiana.....	90 cents per ton.
Elk Garden, West Virginia.....	50 cents per ton.
Glen Mary, Tennessee.....	4½ cents per bushel.
George's Creek, Maryland.....	50 cents per ton.
Hocking Valley, Ohio.....	80 cents per ton.
Kanawha River, West Virginia.....	3 cents per bushel.
Myersdale, Pa.....	40 cents per ton.
Missouri (Ray County).....	6 to 7 cents per bushel.
Mahoning Valley, Ohio.....	65 to 75 cents per ton.
Murphysboro, Illinois.....	75 cents to \$1 per ton.
Nova Scotia mines.....	34 cents per ton.
Reynoldsville, Pa.....	50 cents per ton for Run of mine coal.

## COAL USED IN IRON MAKING.

The following statement shows the quantity of coal used in iron making, taking the figures of 1881, as a basis :

	Total pig iron manufactured. Tons.	Quantity of coal raised. Tons.	Tons coal used making pig iron.	Percentage of total coal used in pig iron manufacture.
Great Britain.....	8,377,364	154,184,000	18,011,332	11
United States.....	4,641,676	70,000,000	9,979,503	14
Germany.....	2,982,852	45,000,000	6,413,131	14
France.....	1,894,954	19,000,000	4,074,151	26
Belgium.....	615,000	16,866,000	1,322,250	7
Russia.....	450,000	2,950,000	967,500	32
Austro-Hungary.....	480,000	5,378,604	1,032,000	19

Mr. J. M. Swank, furnishes the statement below, which shows, in net tons, the quantity of pig iron produced in each of the years 1879, 1880, 1881 and 1882, with Bituminous coal, Anthracite coal and charcoal, it being understood that the second of these classifications is not absolutely accurate, as coke is used as a mixture in many Anthracite furnaces :

Fuel used.	1879.	1880.	1881.	1882.
Bituminous.....	1,438,978	1,950,205	2,268,264	2,438,078
Anthracite.....	1,273,024	1,807,651	1,734,462	2,042,138
Charcoal.....	358,873	537,558	638,838	697,906
Total.....	3,070,875	4,295,414	4,641,564	5,178,122

## RECEIPTS &amp; SHIPMENTS AT CHICAGO, 1881-82.

Below will be found the official statement of the Anthracite Coal Association of Chicago, covering the season from May 1, 1881 to May 1, 1882. Anthracite on hand May 1, 1882, was 183,863 tons as against 6,000 tons a year previously.

		Tons 1882.	Tons 1881.	Increase.
ANTHRACITE.	Receipts by Rail.....	431,919	420,567	11,452
	Receipts by Lake.....	598,913	379,367	219,546
BITUMINOUS.	Receipts by Rail.....	2,173,429	1,751,355	422,074
	Receipts by Lake.....	292,892	236,403	56,489
Totals.....		3,497,153	2,787,692	709,461
Shipments by lake and rail.....		655,614	627,913	28,701

**Cambria Iron & Steel Works.**—This enterprise, owned by the Cambria Iron Company, operates a large mineral property. They have five hundred coke ovens in the Connellsville region, and one hundred and twenty of the improved Belgian ovens, at Johnstown. The amount of coal consumed in one way and another is 775,000 tons a year. The production of coke from their own plant is 300,000 tons annually.

**New York, Susquehanna & Western Railroad Company.**—This Corporation owns land in the Anthracite coal region, near Scranton and Archbald, and expects to handle a million tons of coal this year. Railroad extends from mines in the region to a connection with D. L. & W. Co., at Scranton, and from West End, N. J. to Stroudsburg, Pa.

**New York & New England R. R.**—This line from its extension to the Hudson River, opposite Newburgh, N. Y. has a connection with the Anthracite coal fields particularly with the mines of the Pennsylvania Coal Company, and the Delaware & Hudson Canal Co.; the coal first passing over the 'Erie' Railway, and its connections in the coal field named. It is stated that 100,000 tons of all rail coal were marketed in New England by this route in 1882.

**Lehigh & Hudson R. R.**—This line extends from Greycourt, N. Y. on the N. Y., L. E. & Western Railroad to Belvidere, Pa., on the Belvidere division of the Pennsylvania Railroad. The distance between the two points is 62 miles, and the road was built to carry Lehigh Coal to New England all rail via Newburgh, N. Y.

**North and West Branch.**—This line extends from Catawissa to Wilkes-Barre, Pa.; is 46 miles in length, and will enable the Anthracite coal of the Susquehanna or other collieries to be forwarded west and southwest, wherever the lines of the Pennsylvania Railroad system extend.



**The Norfolk & Western Railroad Company** has completed extensive coal shipping piers at Norfolk, Va. The coal is to come from lands owned or controlled by the company in the southwestern part of the state, of which Pocahontas is the mining center.

**Big Tow.**—During last summer the steamboat *J. B. Williams*, of Pittsburgh, arrived at New Orleans, La., with thirty coal boats and barges. The fleet was 175 feet in length and 40 feet in breadth. To have transported this coal by rail would have required 25,000 flat cars, with a power of 1,250 locomotives, which, if strung out, would reach nearly from New Orleans to Baton Rouge. This is not the largest tow this boat is capable of taking out, however, she having surpassed this heretofore. The cost of transportation on coal by these immense tows is very low. It averages but  $3\frac{1}{2}$  cents per bushel from Pittsburgh to New Orleans, a distance of 2,000 miles.

**Coal Cutting.**—Machinery must sooner or later take the place of much of the manual labor employed in coal mining. It will be to the advantage of both employer and employee, for it will elevate the laborer and make his skill more valuable, and this will result in profit to the employer. The Harrison and Lechner are the two machines that are used in American mines.

Mining coal is not an unhealthy occupation; statistics prove that the average death rate among miners is less than in other occupations.

In 1881, there was shipped from Philadelphia, 20,570 tons Anthracite and 37,203 tons Bituminous coal to foreign ports.

Rio-de-Janeiro received 224,551 tons of coal in 1881, against 201,567 tons in 1880. It was British coal and received from Cardiff. There were only 200 tons sent from the United States.

In the period from 1871 to 1880, some 300 vessels were reported missing by Lloyds. Among them were 220 coal laden vessels; as these were total losses the crews numbering 3,500 persons perished.

**Erie, Pa., Business for 1882.**—Receipts of Coal at Erie, Pennsylvania. So far as could be ascertained, for the year ending December 31st, 1882:

	Anthracite.	Bituminous.	Total Tons.
By Philadelphia and Erie Railroad.....	314,112	55,608	369,720
By Erie and Pittsburgh Railroad.....	.....	110,156	110,156
Total.....	314,112	165,764	479,876
Disposition.	Anthracite.	Bituminous.	Total tons.
Lake.....	134,147	145,008	279,155
Rail.....	147,246	6,000	153,246
Local, Erie.....	32,719	14,756	47,475
Total.....	314,112	165,764	479,876
L. S. & M. S. R. R. report not received.			













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